ANNALS

OF

OTOLOGY, RHINOLOGY

AND

LARYNGOLOGY.

VOL. XIV. SEPTEMBER, 1905, No. 3.

Symposium: Disease of the Accessory Sinuses.

XXV.

FRONTAL SINUSITIS—DIAGNOSIS, TREATMENT AND RESULTS.*

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NEW YORK.

ACUTE FRONTAL SINUSITIS.

The basis of the following remarks is derived from a study of fifty-eight cases of acute frontal sinusitis, occurring in private practice between January 1, 1903 and January 1, 1905.

Diagnosis. The diagnosis of acute frontal sinusitis is made from a grouping of certain symptoms given by the patient, together with the observations of the physician as a result of his examination.

*Read before the American Laryngological, Rhinological and Otological Society, Boston, 1905.

As acute frontal sinusitis seldom occurs alone, but with simultaneous involvement of some of the other sinuses, patients give a composite set of symptoms varying with the sinuses affected and the relative severity of each.

SUBJECTIVE SYMPTOMS.

First. Pain or Neuralgia. The most important symptom from the standpoint of patients is the pain or neuralgia for which they seek relief. It is most intense in the supraorbital region of the forehead. It may, however, radiate thence to the temporal region, ear, back of the eye, vertex or occiput. The pain is not always constant, but usually worse in the morning for the first hour after awaking. During the day there are frequent painful periods, lasting from a few minutes to an hour, and then there may be considerable diminution before the next paroxysm appears. During the height of the paroxysm, in addition to the lancinating, shifting, neuralgic pain, there is frequently a marked pulsation or throbbing referred to the region of the frontal sinus. Blowing the nose is usually such a painful act, and so greatly intensifies the pain over the eye that most patients perform this act as infrequently as possible. Percussion on the forehead over the affected sinus is invariably painful and in marked contrast to the painless percussion over the corresponding area on the healthy side. Kuhnt, in his work, "Ueber die entzündlichen Erkrankungen der Stirnhöhlen und ihre Folgezustände," Wiesbaden, 1895, claims that the outlines of the diseased frontal sinus may be quite accurately determined by percussion over the forehead. We have not been able to verify this statement except in a general way. Unquestionably the larger the frontal sinus, the larger the area over which one elicits pain on percussion; more than this we cannot state. More typical, however, than the percussion over the frontal region is the pain produced by pressing upon the floor of the frontal sinus above the inner canthus of the eye. This pain is very marked and is quite analogous to the pain produced by pressure on the mastoid in acute mastoiditis. A less degree of pressure is necessary than in mastoiditis, as the floor of the frontal sinus is at this point thinner than the average cortex of the mastoid. In no single instance of acute frontal sinusitis has this sign been absent. In one case, cited below, there was present the intense neuralgic pain in the right supraorbital region, pain

on percussion over the frontal surface of the frontal bone, and intense pain on pressure over the orbital plate of the frontal, and yet on operation we found that the patient did not have any right frontal sinus.

Second. Discharge from the Anterior Nares or into the Naso-Pharynx. Every case of acute frontal sinusitis was accompanied by a discharge from the sinus into the nose While it is possible to conceive of a total occlusion of the naso-frontal duct, we have not met with one. In the upright posture the discharge enters the middle meatus, whence it drops down to the floor and is blown from the anterior nares. During the time that the patient is in the recumbent posture, the direction of the flow is backwards along the upper surface of the inferior turbinate into the naso-pharynx. Occasionally when some obstruction exists anterior to the opening of the naso-frontal duct, the discharge is entirely directed posteriorly, even when the patient is in the upright position. In the earlier stages of the inflammation the secretion is thick, glairy, whitish, mucoid in character; at this time, when examined microscopically, it consists of mucus in which are imbedded a considerable number of well-preserved leucocytes. As the disease progresses the discharge becomes yellowish, still remaining tenacious, and the number of leucocytes greatly increases. With spontaneous or other cure, the discharge becomes less yellow, the number of leucocytes diminishes, and it takes on more of a serous character at its termination. As the disease passes from the acute to the chronic type, the discharge loses its mucoid character, becomes thinner, distinctly yellow, and the pus cells, many of which are disintegrated, predominate. The discharge from a frontal sinus cannot be distinguished from that which comes from an antrum or any of the other accessory sinuses in the nose. Discharge alone, therefore, from the nose or naso-pharynx is not sufficient evidence to warrant a diagnosis of frontal sinusitis.

Third. Nasal Obstruction. In a very large percentage of cases there is sufficient turgescence and swelling of the mucous membrane of the middle turbinate and the rest of the nasal mucosa, to prevent respiration through the affected side. This symptom is not peculiar to frontal sinusitis, but is a part of the history of acute rhinitis as well as that of acute infections of the other accessory cavities which are so often simultaneously involved.

Fourth. Anosmia. The loss of the sense of smell is directly due to the nasal obstruction above mentioned. While present in most cases of acute frontal sinusitis, it is by no means solely limited to affections of this sinus.

Fifth. Redness of the Alae Nasi, Eczema and Herpes Nasalis. The above-mentioned conditions are very common in acute suppurations of the frontal sinus, but like the two preceding may also exist independent of sinusitis. They are due to the frequent use of the handkerchief, to the softening and maceration of the skin and the infection of the same from the irritating discharge.

Sixth. Edema and Redness of the Upper Eyelid. In some of the more severe cases in which the outlet of the naso-frontal duct is greatly narrowed and the secretion within the sinus under considerable pressure, the interference with circulation in the bone and periosteum over the sinus manifests itself as an edema usually with some redness or ecchymosis of the upper eyelid and the skin over the forehead near the median half of the eyebrow. In our series of fifty-eight cases this symptom occurred eleven times.

Seventh. Bulging of the Walls of the Sinus. As a result of greater pressure of the contents within the sinus, the walls of the frontal sinus bulge at their weakest point. This is usually at the floor of the sinus just above and posterior to the inner canthus of the eye. Palpation in this region, exquisitely tender under these conditions, always shows a convexity of the floor instead of the concavity as ordinarily found. Five of our series presented marked bulging of this kind. The anterior wall is said to have been the seat of bulging, but we have never met with a case.

Eighth. Diplopia. When the prolapse of the floor of the sinus is considerable, the eyeball may be displaced downwards and outwards with a consequent diplopia. Two cases presented this symptom. The eyeball not infrequently has the appearance of being displaced downwards and outwards when there is edema of the upper eyelid; one must be careful, therefore, to distinguish between actual and apparent displacement of the eye. An associated ethmoiditis may cause displacement of the globe of the eye. The differential diagnosis may be difficult, but in either case immediate operative treatment is demanded to relieve the pressure.

Ninth. Fistula Formation. Unless the tension within the

frontal sinus is quickly relieved from the conditions mentioned under headings VII and VIII, the contents of the sinus break through the bony wall of the floor of the cavity, distend and necrose the skin of the upper eyelid, forming a fistula in this region. None of my acute cases developed a fistula. One of the series in the chronic cases had a fistula develop in the acute stage, a result of failure on the part of the attending physician to recognize the trouble.

Tenth. Instances are on record where the posterior wall of the frontal sinus has been absorbed from pressure and the contents evacuated into the cranial cavity with a resultant meningitis. It is possible that this happened in one of my cases (Case III), but as there was an associated ethmoiditis and sphenoiditis and no autopsy was allowed, the matter will always remain in doubt.

OBJECTIVE SYMPTOMS.

Examination. While some of these points have been given above, there remain the examination of the nose and nasopharynx. On inspecting the nasal cavity of the affected side the mucous membrane is usually found so red and swollen and the cavity so filled with tenacious muco-pus as to render any exact diagnosis impossible without first contracting the tissues with cocain and adrenalin. When this has been accomplished muco-pus will usually be observed issuing from below the middle turbinate, or between it and the outer wall. Secretion in this region may have come either from the frontal sinus, ethmoidal cells or antrum. The antral source of secretion can usually be quickly eliminated by puncturing and washing out that cavity, thereby removing the secretion. If there is still secretion issuing from the middle meatus, the frontal sinus and ethmoidal cells remain to be considered. If pain on percussion and pressure over the frontal sinus has previously been obtained, and if in addition transillumination of the frontals shows considerable darkness on the affected side as compared with the healthy side, the presumption of frontal sinusitis is so great that one may regard it as practically certain. On account of the proximity of the middle turbinate to the outer wall of the nose, we have never been able to pass a probe or canula through the naso-frontal duct into the sinus in an acute case without having recourse to one of two measures:

First. The use of the medium sized Killian nasal speculum which is inserted, with the blades closed, between the middle turbinate and the outer wall and then the blades opened so as to spring the middle turbinate over towards the septum. While theoretically this may be done, in many cases it is practically impossible, in private patients, on account of the great pain produced even when the parts are thoroughly cocainized. If the septum is deviated to the affected side it may leave insufficient space for the pushing over of the middle turbinate. We have employed this method in some of our clinic cases and thus assured ourselves of its availability.

Second. The anterior end of the middle turbinate may be removed with forceps and snare sufficiently far back to uncover the outlet of the naso-frontal duct. It may then be possible to probe or catheterize the diseased frontal sinus. We have seldom found the naso-frontal duct so patent in acute cases as it is in chronic suppuration of the frontal sinus. At best, probing and catheterizing in acute cases is a very painful procedure, and of doubtful utility. Examination of the posterior nares reveals nothing typical of frontal sinusitis. The posterior ends of the inferior and middle turbinates are swollen and hyperemic; above the inferior turbinate and stretching down to the upper surface of the velum there is often seen a thick, tenacious secretion. In the event of such obstruction in the anterior nares as to prevent the secretion passing forward below the inferior turbinate, the post-nasal secretion should excite one's suspicion of a sinusitis; such a secretion, however, may come from the antrum, ethmoidal cells, or frontal sinus or possibly the sphenoid.

Acute Frontal Sinusitis Combined With Acute Inflammation of the Other Sinuses. In some cases it is very difficult to determine the number of the other accessory sinuses involved at the first visit, owing to the intensely swollen condition of the nasal mucous membrane. Transillumination of the antra is a simple procedure, and shadows point to the probability of their being involved. Of the fifty-eight patients, seventeen had both of the frontal sinuses involved, while forty-one had only a single sinus, the right twenty-two times and the left nineteen times. Of the forty-one cases of unilateral frontal sinusitis the antrum showed clear on transillumination seven times and was not irrigated. In the thirty-four cases where there was a shadow on the face of the affected side, the antrum

was irrigated and pus washed out in each case. Of the seventeen cases of bilateral frontal sinusitis, both antra were irrigated, owing to imperfect transillumination, and pus found in every case. The larger percentage of maxillary sinusitis associated with frontal sinusitis may be accounted for in the greater severity of the nasal inflammation, all being severe cases of influenza. In thirteen of the thirty-four unilateral cases, the antrum was irrigated but once, the shadow growing less and disappearing after three to seven days. In these cases there was probably but slight thickening of the mucosa, the antrum being mainly a reservoir for the pus from the frontals and ethmoids. In the other twenty-one cases the original shadow was darker and the antrum irrigated two or more times, the greatest number in a girl of sixteen who was irrigated every other day for two months. The seventeen cases of bilateral fronto-maxillary-sinusitis all had their antra irrigated more than once. The antrum was therefore involved in fifty-one cases of the fifty-eight.

Ethmoiditis was considered to be present when considerable swelling was found in the region of the bulla and posteriorly. In forty-seven cases the swelling was marked and ethmoiditis considered present. In twenty-six cases the sphenoid was involved as determined by irrigating the cavity. In the seventeen bilateral frontal cases, both sphenoids were involved in eight, the right sphenoid in two and the left in three, making thirteen cases in all. Of the remaining thirteen cases complicating the forty-one unilateral frontals, the right sphenoid was involved eight times and the left five times.

Prognosis. We feel confident that many cases of acute frontal sinusitis occur, fail to be diagnosed, and yet get well without any special treatment directed to the nose or sinus. Many of the chronic cases, provided the disease has not existed too long, can recall the beginning of their trouble, the intense suffering for a week or so, and then the discharge or "catarrh" as they term it, persisting till the true condition is discovered. Of the fifty-eight cases, fifty-five (95 per cent.) made complete recoveries as a result of intra-nasal treatment. One case treated intra-nasally died within twenty-four hours after I saw him. Two cases were operated on by the external method, one of which, a desperate one with beginning meningitis, died forty-eight hours later of meningitis and sepsis. The other recovered. One case (not included in the series)

diagnosed as frontal sinusitis proved to have no sinus—she recovered.

So far as known only one case among the fifty-five had a return of the disease, in February, 1905, accompanying an attack of the grippe.

The average duration of treatment was nine days, the shortest four days (stopped treatment when pain ceased). The longest was under observation for two months on account of an associated acute maxillary sinusitis, the frontal discharging for five weeks at least, and possibly a little longer.

TREATMENT.

Constitutional. Patients suffering from acute frontal sinusitis should remain indoors and be given such drugs as would ordinarily be used in abating the general infection, as for example, influenza of which the sinusitis is but a complication. Quinine in suitable doses, salol or aspirin, belladonna or atropin pushed to their physiological effect have all proved serviceable in these cases. In the earlier stages of the inflammation a drop of aconite repeated every fifteen minutes until profuse perspiration has been produced often relieves the turgescence in the nose and favors drainage. Calomel followed by the salines for evacuation of the bowels should be given in all cases. The coal tar analgesics such as phenacetine, antipyrin, etc., had frequently been prescribed by the family physician for the pain, but seldom afforded much relief.

Opium and morphine, it seems to me. are contra-indicated in these cases just as much as in acute mastoiditis, for in alleviating the pain they mask the fact that the secretion may still be under considerable tension with insufficient drainage, and lure the patient and physician into thinking the condition is improving, whereas it may be getting so decidedly worse as to be of considerable danger to the life of the patient.

External Local Treatment. External applications of moist heat, by cloths wrung out in very hot water, not infrequently contract the blood vessels of the mucous membrane in the frontal sinus and its duct so as not only to diminish secretion, but to increase the caliber of the canal and afford better drainage for the secretion, which has accumulated in the sinus. This form of heat has almost always proved agreeable, giving great relief. Occasionally cold applications in the shape of ice cloths or an ice bag to this region will produce the same re-

sults on the blood vessels as that usually produced by heat. Cold, however, is not usually so well borne as heat.

Internal Local Treatment. The first consideration on the part of the physician should be the establishment of adequate drainage from the sinus. In a large percentage of cases the obstruction lies in the lower portion of the naso-frontal duct where it opens into the middle meatus, from the swelling of the nasal mucosa in this region. In the milder cases solutions of adrenalin 1-10,000 sprayed into the nose every two hours not only contract the mucous membrane here, but also that over the middle turbinate, to such an extent as to afford satisfactory drainage. In some cases adrenalin does not produce the effect desired, and one may then have recourse to spraying the middle meatus, beneath the inferior portion of the middle turbinate, with a 2 per cent. solution of cocain. In recommending this, however, I fully realize the danger of the patient contracting the habit if he were allowed to use it himself. A trained nurse or some member of the family alone should be entrusted with the cocain spray, with instructions to use it only so frequently as may be necessary. When the nasal mucous membrane has been contracted by the adrenalin or adrenalin and cocain the nose should be syringed with a solution of sodium chlorid and sodium bicarbonate, a teaspoonful of each to the pint of sterile water at a temperature of about 115 degrees Fahrenheit. Most patients stand this temperature very well. The first syringe full will be considered pretty warm, but the subsequent ones will not be complained of, and the contracting effect on the blood vessels of the hot alkaline, saline solution is most beneficial. We have often found that spraying the nose with an oil spray—Menthol grs. xv, Camphor grs. x, Oil pini pumilionis m. vii, Benzoinol q. s. ad oz. ii, keeps the nasal mucous membrane contracted and induces a serous flow from the mucosa which greatly helps in diminishing the obstruction around the lower portion of the naso-frontal duct. Steam inhalations where the nose is very greatly obstructed will do the same as irrigation, but of the two I prefer the irrigation, as it removes the secretion at the same time that the local effect of the heat is obtained. Should the above procedures not suffice in establishing good drainage from the frontal sinus as evidenced by the continuation of the pain after twenty-four hours, or should any of the symptoms enumerated under VI, VII, VIII be present at the first visit of the patient,

no time should be lost in removing the anterior third of the middle turbinate so as to uncover the region of the lateral wall of the nose into which the naso-frontal duct opens. One should never forget that the naso-frontal duct does not open constantly at any one place in the nose; it is sometimes situated well forward, at others as far back as the middle of the middle turbinate. The amount of tissue that will have to be taken away will therefore greatly depend upon the position of the naso-frontal duct. The mere taking away of a small portion of the anterior end of the middle turbinate, unless it happens to expose the naso-frontal duct, is of little value. The snare alone does not remove enough of the middle turbinate to be of much value; a pair of forceps—Myles' nasal cutting forceps are the ones we prefer—should be inserted high up, one blade each side of the middle turbinate so as to excise the anterior third of the attachment of the middle turbinate to the outer wall of the nose. The snare then inserted through this cut area will remove the offending portion in a large majority of cases. The bleeding, if the parts are thoroughly cocainized and adrenalized, is seldom very great at the time of operation. By insufflating some powdered suprarenal gland what little hemorrhage there is can be checked in the course of two or three minutes. If now we irrigate the nose with hot normal saline the powder will be removed, together with the blood clots, so that inspection will enable us to determine whether we have removed enough of the middle turbinate to uncover the naso-frontal duct; if not, Grunwald's punch forceps, Myles' punch forceps, or some of the other types of forceps used for intra-nasal work should be used to remove enough more of the middle turbinate to afford adequate drainage. Should, as occasionally happens, small polypi be found beneath the middle turbinate, they are best removed with the forceps, as it is these, often times, which are the offending bodies in blocking drainage. In cases where polypi are found in the middle meatus, it is our belief that we have to deal in most cases not with an acute frontal sinusitis, but merely an acute exacerbation of a mild frontal sinusitis that has existed some time.

External Operative Treatment. Whenever the intra-nasal treatment of acute frontal sinusitis does not succeed in establishing adequate drainage through the naso-frontal duct, then it becomes necessary to open into the frontal sinus through the

anterior or inferior wall. Certain symptoms and signs justify us in performing this operation.

These are:

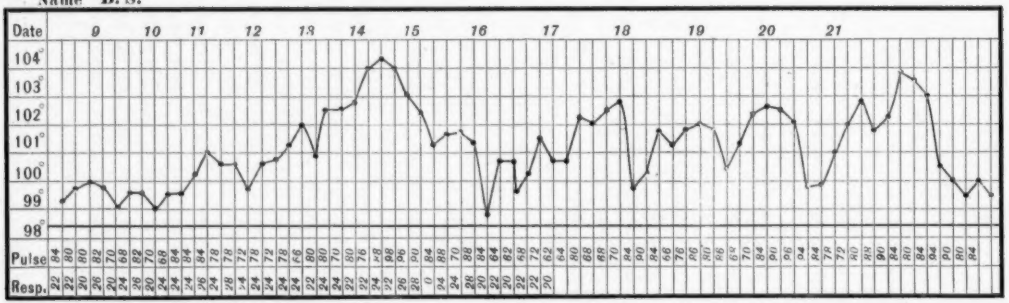
Marked bulging of the inferior wall of the sinus with evident pointing, as if the contents were about to be evacuated. Oftentimes one sees a lesser degree of bulging which subsides when intra-nasal treatment is vigorously carried out. If, however, symptoms of meningeal irritation exist or meningitis has begun, or if actual displacement of the globe of the eye with diplopia obtains, or if, accompanying the headache there is marked dizziness and vertigo, it seems to me we are justified in urging external operation. I wish, however, to state that these symptoms in acute cases are infrequent. On account of the associated eye symptoms and the disturbance of vision, patients often apply to an oculist rather than to a rhinologist for treatment. Each man will have to be a judge for himself as to when he shall operate in these cases. My experiences with such severe cases have been four:

Miss B. S., age 30. Seen on January 28, 1903. Had had severe grip for five days with considerable discharge from both nasal cavities, more on the right; marked supraorbital pain on the right, none on the left. Two days ago developed pain in right ear. Examination showed the right membrana tympani red and bulging; slight tenderness over mastoid antrum; considerable muco-purulent discharge from right middle meatus; septum deviated to right so as to preclude view of right middle turbinate. Great tenderness on percussion over the right frontal area and orbital plate. Under nitrous oxide anesthesia, paracentesis of right membrana tympani; smear made from discharge revealed diplococcus of pneumonia. Temperature 100.4, pulse 80. Until February 2nd patient ran a slightly irregular temperature, varying from 99 to 101, pain over right forehead became more intense, with slight edema of the upper eyelid. On account of deviation of septum impossible to do more than keep the mucous membrane contracted with adrenalin and cocain; mastoid pain also slightly increased, discharge fairly profuse; ear irrigated every two hours with boric acid. On February 2nd temperature gradually rose to 102, frontal headache increasing to such an extent that the patient begged to have something done to relieve it. Hypo of ¼ grain of morphin gave but little relief. On the afternoon of Feburary 3rd, the temperature was 103.8, pulse 90,

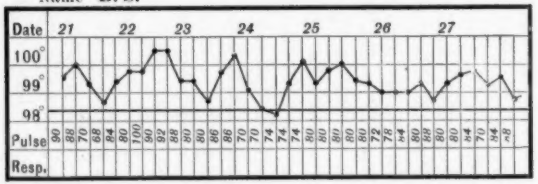
Name S. W.
Admitted June 3rd 1903
Date June 3 4 5 6 7 8 9 10 11
105°
104°
103°
102°
101°
100°
99°
98°
Operation
Golf Stick
2nd Operation
Chill
Chill
Pulse
Resp.

Name B. S.
Date Jan. 28-29 30 31 1 2 3 4 5 6 7 8
105°
104°
103°
102°
101°
100°
99°
98°
Operation
Pulse
Resp.

Name *B. S.*



Name *B. S.*



respirations 28. At 5 o'clock of the same day, the temperature was 105.6, pulse 110, respiration 24. Pain over the right forehead had increased as also the tenderness over the mastoid. Patient begged to have something done for the relief of pain. It was decided to open the right frontal sinus externally. On exploring the right frontal region, absolutely no trace of a sinus could be found; the diploe was found to be soft and bled profusely. Although we explored towards the nose to the level of the inner canthus of the eye, exposed the posterior table of the frontal, went outward to the middle of the orbit and inferiorly to the roof of the orbit, no right frontal sinus could be found in this region. The left frontal sinus was found to extend in a tongue like projection, one-fourth inch to right of median line, three-eights of an inch above the glabella. The mucous membrane lining it was perfectly healthy, no secretion in the cavity. A probe could be passed through this cavity down the left naso-frontal duct into the nose. The frontal wound was packed, A seperate piece of gauze was placed across the opening made into the left frontal sinus.

Dr. Robert Lewis, Jr., operated on the mastoid, finding but a few cells involved near the tip which were filled with gelatinous infiltration of the mucous membrane and scarcely any secretion. Patient's temperature fluctuated between 105½ and 99 until February 9th, it then ranged between 99 and 100 for two days, when it gradually rose again until February 13th, when it reached 105.2. At this time the patient developed a slight broncho-pneumonia. The temperature ranged in the succeeding days, until February 18th, between 100 and 103 and gradually rose until February 20th, when the temperature reached 104. During all this time the mastoid was healing in the usual way. Cultures taken from this wound were sterile. There was the usual discharge from the frontal wound, cultures from which showed streptococci. There was no discharge from the left nasal cavity to indicate that the left frontal sinus had been infected during or subsequent to the operation. The discharge from the right nasal cavity ceased five days after the operation. The patient was seen several times by Dr. Robt. Lewis, Dr. Weeks, who examined the eyes with negative results, Dr. W. Gilman Thompson and Dr. Robt. Carlisle. We all felt that there was some other suppuration which had not as yet been discovered. On account of the persistent headache in the left frontal region we suspected an abscess in the frontal

lobe of the brain. We decided to wait for more localizing symptoms before operating further. On February 21st the temperature rapidly dropped to 99.6, fluctuated between 98.6 and 100.4 for three days when it became normal and remained so. The mastoid wound healed in six weeks, the frontal in seven weeks. The patient recovered and is well at the present time. In this patient every indication pointed towards frontal sinusitis but we are unable to explain the symptoms preceding operation except on the hypothesis of intense congestion without apparent suppuration in the diploë in the right frontal region. Had we been able to take a skiagraph of this patient's head prior to operation, she would probably never had been operated upon for frontal sinusitis.

Case II—For the history of the second patient I am indebted to Dr. Robert Lewis, Jr., with whom I saw the patient in consultation. S. W., age 35. First seen on June 2nd, 1903, by Dr. Lewis. Had profuse discharge from the left side of the nose for the previous three weeks, pain and swelling of left cheek and both lids of the left eye. Gave a history of syphilis. June 3rd, Dr. Lewis opened the maxillary antrum through the canine fossa. The cavity was filled with granulation tissue and pus; necrosis of the entire floor of the orbit and wall of the left nasal fossa. All the bone of the floor of the orbit above the antrum was removed; temperature 102 4-5, pulse 128. Temperature fluctuated on June 4th, 5th and 6th between 101-8 and 99.6, pulse about 100. One June 7th, temperature rapidly rose from 100 to 105 2-5. On June 8th, exophthalmos, very intense pain in left eye; upward and inward movement of the eyeball interfered with, diplopia; temperature 103, pulse 116. On June 9th, temperature again rose to 105, pulse 120. On this date I saw the patient with Dr. Lewis and advised opening the frontal sinus and ethmoidal cells. This was done. The whole lower portion of the frontal sinus was necrosed exposing the periosteum of the orbit; the ethmoidal cells were also badly necrosed, thoroughly opened and curetted. At the time of the operation, 10 p. m., the patient was slightly delirious. On the morning of the day after the operation, June 10th, the temperature dropped to 100 and rapidly rose after a chill to 106 at noon. At 6 p. m. it dropped again and rose with a second chill at 8:30 to 105.8, pulse 144. Meningitis more pronounced, rigidity of the neck. Patient died on the evening of June 11th from basilar meningitis and

general sepsis, the point of infection for the brain being probably from the orbit. The cause of the extensive unusual amount of necrosis was probably in great part syphilitic. It was a desperate case for operation and yet that seemed to offer the only possible chance for recovery.

Case III.—Master W., age 17. Healthy specimen of a boy with no previous history of any nasal discharge. While at dinner at 7 p. m. on December 12th, 1903, complained of intense pain back of the left eye. Was unable to finish dinner; lay down and physician summoned who prescribed analgesics without relief. On the 13th pain increased, slight discharge from left nasal cavity, none from right; adrenalin spray prescribed by family physician; morphin administered, pain no better. On December 14th, patient seen by Dr. A. A. Smith, who asked me to see patient in consultation with him. Saw patient at 12:30 noon that day and found considerable discharge from the left nasal cavity, great tenderness on percussion over the frontal and on pressure over the orbital plate of the left frontal. Edema and ecchymosis of the left upper eyelid. Transillumination—left frontal very dark, right frontal clear, left antrum clear. Cocainized left middle meatus and removed the anterior one-third of the left middle turbinate with forceps and snare; about 20 drops of pus followed the excision. Pus seen posteriorly between middle turbinate and septum; this was wiped away. Canula passed into the sphenoid and half dram of pus washed out of the left sphenoidal cavity. Headache somewhat relieved for next three or four hours. Six p. m., patient's eyes examined by Dr. Weeks, who found nothing abnormal in the fundus. Temperature 102, pulse 60. At 10 p. m., headache had returned, temperature 103, pulse 50. December 15th, 7 a. m., the boy was unconscious, pulse 40, neck rigid; died at 11:20 a. m. This case illustrates a most intense type of infection of the meninges, probably occurring early in the course of the sinusitis. As the frontal, ethmoid and sphenoid were all involved, it was impossible to determine which of these was the more responsible for the infected meninges. Unfortunately no culture was taken from the pus to determine the variety of bacteria. Had not Dr. Weeks been so positive about the fundus being normal I should have opened his frontal sinus externally on the evening of the 14th. Had I operated and the end come as rapidly as it did, I would have felt that some fault in technique might have caused the early death of the patient.

Case IV.—F. A. McG., age 24. First seen on March 26th, 1904. The week previous contracted a severe cold in the head with considerable discharge from the left nasal cavity, none in the right. Four days ago had swelling of the left upper eyelid, great headache, supraorbital and vertical. Examination—large quantities of pus in left middle meatus, none in right. Transillumination of right frontal sinus showed small area of illumination, left did not illuminate at all. Right antrum brilliant, left absolutely dark. Irrigated nose with normal saline, punctured and washed out large quantity of pus from left antrum. Removed anterior one-third of left middle turbinate; considerable pus followed the removal; smears from this were examined and showed staphylococci. March 27th, left nasal discharge profuse, swelling of eyelids considerably less. March 28th, edema of eyelids lessening, pain greatly diminished but with considerable discharge from the nose. Again irrigated antrum and washed out considerable quantity of pus. March 30th, pain over eye slightly increased, discharge from nose less. April 1st, much less discharge from nose, only slight pain in the morning, swelling and ecchymosis of eyelid practically disappeared. Transillumination—left frontal sinus same as last time, antrum slightly clearer. April 4th, discharge only slight; examined microscopically showed staphylococci and pneumococci. Left frontal dark, left antrum same as last examination. April 5th, left eyelid very edematous, could scarcely see out of eye; marked bulging of orbital plate, slight diplopia, considerable discharge from nose, great pain over eye. Operation at 4:15 p. m. Usual incision through whole length of eyebrow. Mucous membrane almost black in appearance. On passing probe into cavity, thick muco-pus exuded under pressure, considerably more than half ounce escaping. Opening was enlarged and cavity found to extend to the left to the external angular process. An incomplete septum in the median line was found. The skin incision extended across the median line to the inner one-third of the right eyebrow. Bone over the right side of the sinus removed. A slight depression found in the region of the normal position of the right naso-frontal duct but no communication with the right naris. A very large orbital offshoot extended over the left orbit practically the entire depth. Mucous membrane entirely removed and cavity packed with gauze. Patient made slow but uninterrupted

recovery, the antrum being washed out but once after this, on April 18th. The frontal sinus did not completely heal until February 22nd, 1905. There has been no discharge from the nose since May 5th, 1904. The long healing in this case was undoubtedly due to the enormous size of the sinus.

CHRONIC SUPPURATIVE FRONTAL SINUSITIS.

We have never observed a case of chronic suppurative frontal sinusitis that was not accompanied by a similar condition in some of the adjacent accessory sinuses. There has always been an associated ethmoiditis. In a large percentage of cases the antrum has contained pus, sometimes without much pathologic change in the mucous membrane, at which time it is probably merely a reservoir for the secretion pouring down from above; at other times the mucous membrane of the antrum has been greatly thickened and polypoid owing to chronic inflammation. The sphenoid is also frequently involved, but not nearly so often as the antrum. As a result of the involvement of the adjacent sinuses, the symptoms and physical signs present a complex picture.

DIAGNOSIS.

The diagnosis of chronic frontal sinusitis, like that of acute, is based upon the symptoms given by the patient and the examination of the physician. The former rarely points so directly to the involvement of the sinus as in acute cases, consequently the examination plays a far more important role.

SYMPTOMS.

Discharge.—Discharge in chronic frontal sinusitis, or "catarrh," as the patients usually term it, varies considerably in amount with the size of the sinus but it is far more dependent upon the number of the accessory sinuses which are simultaneously involved. If the frontal and ethmoids alone are involved, the discharge is not usually very profuse; if the antrum is also involved, the amount is greater, the bulk of which, of course, comes from the antrum. In character it is almost invariably a pure purulent discharge, which if examined microscopically, will be found to consist of pus cells and their broken down detritus. If putrefactive organisms have gained access to the cavity, the discharge has an odor of sulphureted hydrogen. This, however, is not so common with the frontal sinus as it is in the associated disease of the antrum. From the dis-

charge alone as described by the patient, it is impossible to make a diagnosis of frontal sinusitis.

2. *Frequent taking cold.*—A very large percentage of these cases have moderate acute exacerbations several times a year, anl they call such attacks "colds in the head." The pharyngo-laryngitis accompanying ordinary rhinitis is often absent.

3. *Fullness in the frontal region. Pain.*—Most patients complain of a feeling of fullness in the region of the frontal sinus which is aggravated by intense mental application. During the time when they have acute exacerbations, their taking cold periods, this fullness is more marked anl in many amounts to a dull pain. It is seldom the neuralgic pain that occurs in acute sinusitis.

4. *Dizzinesss and Vertigo.*—These two symptoms are occasionally noticed and I am at a loss to know whether the symptom is due to the frontal sinus disease alone or more frequently to the ethmoid and sphenoidal sinusitis which so frequently is present.

5. *Kakosmia and Anosmia.*—Kakosmia, or the subjective sense of bad odor in the nose, is present in a moderate number of cases. It has been present when I have been unable to detect any odor in the secretion wiped away with an applicator. Anosmia is often present when the nose is obstructed with polypi or intense hypertrophy of the mucous membrane of the middle turbinate.

6. *Edema and Redness of the Upper Eyelid and Bulging of the Orbital Wall of the Frontal Sinus.*

7. *Diplopia.*

8. *Fistula Formation.*—These have all been observed in a few cases and are usually evidence of acute exacerbations of a chronic suppurative process, accompanied by marked obstruction to the outlet of the pus through the naso-frontal duct. They have been more fully described under acute frontal sinusitis.

EXAMINATION.

1. Examination of the nose on the affected side usually reveals the presence of pus in the middle meatus between the middle turbinate and septum. It has frequently occurred in our practice that on the first examination of the patient, no secretion has been visible, owing to the fact that it is quite common for a patient to blow his nose on entering one's office and thus entirely rid himself of the accumulated secretion. In this

way we have at first overlooked the disease, when a subsequent visit revealed the secretion in this region, and led us to investigate the accessory sinuses. As in acute cases pus in this region may have come from the frontal sinus, antrum or anterior group of ethmoidal cells. The same means of differentiating are to be taken in chronic cases as already given in the acute ones. Postnasal examination has occasionally discovered pus over the end of the inferior turbinate when none was visible anteriorly; this has been the means of our investigating and discovering sinus disease when the patient's history would not have led one to suspect it.

2. Multiple polypi in the nose should always cause the investigator to make careful search of the accessory sinuses. With but one exception during the past two years, investigation has proved that patients with polypi have had accessory sinus disease, not always, however, of the frontal sinus.

3. Percussion over the frontal sinus is seldom painful except during an acute exacerbation of the chronic sinusitis.

4. Pressure on the orbital surface of a diseased frontal sinus has in almost all cases been more sensitive than similar pressure on the healthy side. I regard tenderness on pressure over the floor of the frontal sinus as a valuable sign pointing towards a chronic inflammation within the cavity.

5. *Transillumination.* — Transillumination of a diseased frontal sinus will in many cases show a markedly smaller area and far less perfect illumination than on the healthy side. Frontal sinuses vary considerably in size and a smaller area of illumination is always to be expected when the sinus on one side is smaller than on the other, so that differences in illumination alone are not of too great diagnostic importance. If, however, the illumined area is more of a cherry red color than the brighter pink that one sees in a sinus filled with air, the value of trans-illumination is enhanced.

6. *Probing the Frontal Sinus.*—In cases of chronic frontal sinusitis a probe can in a large percentage of cases (in 101 of the 113 sinuses here recorded) be passed up the naso-frontal duct and into the cavity of the sinus. It is more easily accomplished if polypi are associated with frontal sinusitis, as the middle turbinate is almost always pushed well over towards the septum leaving abundant space between the middle turbinate and the septum for the passage of a probe as soon as the larger polypi have been removed.

In cases unassociated with polypi, the middle turbinate usually hangs so close to the outer wall that it is a considerable hindrance if not an absolute impediment to the passage of the probe. We may often overcome this difficulty by taking a Killian's long speculum which is inserted between the middle turbinate and the outer wall, the parts being thoroughly cocainized, and the blades opened. The middle turbinate is thus sprung towards the median line leaving sufficient space for the passage of the probe. As, however, the preliminary step in the intranasal treatment of such cases is often the removal of the anterior portion of the middle turbinate so as to do away with the immediate obstructing medium, we frequently excise the anterior end and a few days later have little difficulty in passing a probe into the sinus. The proper curve for the probe varies slightly with individual cases but the one here shown with slight increase or diminution of curvature will be found to pass fairly readily. The length of the probe when within the frontal sinus, measured from the tip to the point where the probe passes over the entrance of the vestibule of the nose at its junction with the tip, varies from 8 to 9½ centimeters. Anterior ethmoidal cells may open alongside of the outlet of the naso-frontal duct and extend upwards towards the root of the nose alongside of and parallel with the naso-frontal duct. It is possible for a probe to enter one of these cells and for the examiner to believe that he is in the frontal sinus when in reality he is in one of the ethmoidal cells. If the precaution, however, be taken to notice the distance and direction that the probe has penetrated, and lay it on the face at the same angle as it lay in the nose, there are few times when one will thus be deceived by a fronto-ethmoidal cell. As a usual thing, a small amount of secretion is forced out of the frontal sinus while the probe is being passed. In a normal frontal sinus when a probe has touched the anterior wall, as it usually does, the sensation is very much the same that would be derived if the probe were passed over a smooth wooden surface. The mucous membrane is so thin that the impression of a hard surface is given. On the other hand in chronic frontal sinusitis with a thickened mucous membrane, the tip of the probe enters a pulpy mass, the feeling of which is not unlike that which is derived on thrusting a probe into a piece of velvet.

7. *Irrigation.*—Once a probe has been inserted into a frontal

sinus it is easy to bend a flexible silver canula of small caliber to conform to the curvature of the probe and pass it into the sinus. By bending the head forward, sterile normal saline may be injected by a syringe into the sinus and the returning fluid caught in a clean black pus basin held below the chin. If all secretion has first been removed from the nose by irrigation and the region wiped clean beneath the middle turbinate with pledgets of cotton, it will be found that ordinarily but a few shreds of muco-pus are washed out of a diseased sinus. The reason for this is that the enormously thickened mucous membrane nearly fills the cavity so as to leave but little space for the accumulation of secretion. One, therefore, need not be chagrined at the small amount of secretion that comes away, or delude himself into thinking that the disease is not very extensive and will readily yield to local treatment.

8. *Skiagraphy.*—Skiagraphy is one of the most valuable diagnostic aids that we have in diseases of the frontal sinus. It enables us to determine the height and breadth of the cavity, the position of the septum between the two, and most if not all the subsidiary, incomplete septa so frequently existing. It will often show us the recess which extends back over the roof of the orbit to a greater or less distance. In a number of the plates which I have had the cloudy outline of the diseased frontal sinus as compared with the clear distinct outline of the healthy sinus left no doubt as to which of the sinuses was diseased. Unfortunately not all the negatives have been sufficiently clear to make the latter point one that can be invariably relied on.

INTRANASAL TREATMENT.

Intra-nasal treatment of chronic frontal sinusitis will be anything but satisfactory unless we bear in mind the probable involvement of the neighboring sinuses. The ethmoids are of the first importance and next the antrum. The sphenoid from its position rarely directly affects the frontal suppuration, but only indirectly through the ethmoids. The antrum should be widely opened in the inferior meatus. The sphenoidal ostium widened and the anterior ethmoidal cells freely opened with the various forceps such as Grunwald's, Myles', etc. Polypi, if present, must be removed as thoroughly as possible. If the middle turbinate renders access to the naso-frontal duct difficult or impossible, remove so much of its anterior

end as may be necessary with forceps and snare. But little surgical work can usually be done in the middle meatus more frequently than once a week or ten days as the inflammation consequent on each surgical procedure renders the part quite sensitive, the absorption of cocain is less free, the pain too great for the patient to bear, and the hemorrhage obscures the operative field. The treatment necessarily is slow and tedious. The next step is to pass a probe into the frontal sinus to determine the position and course of the naso-frontal duct. Unless the cavity can be entered by a probe, any attempt at enlarging the naso-frontal duct is fraught with so great danger to the patient as to be absolutely condemned. The forceps and curette may in such cases readily be pushed upwards through the ethmoid cells and cribriform plate into the cranial cavity and carrying infected material cause a fatal meningitis. A curette, made to follow the course of the probe, is employed to tear away the thickened membrane at the lower part of the naso-frontal duct. The shreds are to be cut away with forceps. If the curette is made to cut forward and inward there is little danger. Curetting outward may result in penetrating the cavity of the orbit and setting up a cellulitis with all its possible consequences. Curetting posteriorly while safe near the outlet of the duct becomes more dangerous the higher we go from liability to penetration of the cranial cavity. The bleeding is always annoying and sometimes considerable. Pledgets of cotton soaked in adrenalin packed into the region usually control it. If on removal, the oozing recurs so as to obscure the field, desist for the day, as blind curettage through a bleeding field is *unsafe*. The object to be attained is the dilatation of the naso-frontal duct so as to establish good drainage and an easy passage for a good sized canula, about a No. 3 Eustachian catheter. If attained, some patients may, after the soreness has subsided, be taught to catheterize and irrigate their own sinuses. A 20 per cent solution of argyrol has seemed to aid in diminishing the secretion. Any one not thoroughly familiar with the anatomy of the sinuses as acquired by considerable study and practice on the cadaver would be unwise in undertaking the dilatation or curettage of a naso-frontal duct.

RESULTS OF INTRANASAL TREATMENT.

My statistics of the intranasal treatment of chronic frontal sinusitis are incomplete, owing to the fact that many of the

patients have been lost sight of. Seventy-nine cases have been treated in this manner. Eleven, or 14 per cent, are considered as cured. They have been seen for two years, at least, after the cessation of all discharge. Most of these patients have had one or more attacks of rhinitis, from which they have recovered. Following these attacks, there has been no discharge from the frontal sinus. Of the remaining 68 cases, 27, or 35 per cent, have been lost sight of. Some of them still had a slight discharge when last seen. Whether these cases are cured, or have passed into the hands of fellow practitioners, I have been unable to ascertain. Of the remaining 41 cases, 24, or 30 per cent, have returned, with recurrences, one or more times a year. Twenty-two of these cases have polypi, which recur at intervals, varying from six months to two years. They are satisfied with the improvement obtained, as the result of the removal of the polypi, and the diminution of secretion from the frontal and other accessory sinuses. Seventeen of the 41 cases, or 21 per cent, after having been under treatment for a period varying from six weeks to three years, finally submitted to a radical operation by the "open method." All have been cured.

To recapitulate, 14 per cent were cured by conservative treatment, 51 per cent improved, and in 35 per cent the result is unknown.

EXTERNAL OPERATIVE TREATMENT.

The indications for operating upon the frontal sinus by some of the well-known methods, are:

First.—Chronic suppurative frontal sinusitis, associated with multiple polypi formation in the nose. These cases are always combined with an ethmoiditis. The intranasal removal of the polypi, curettage of the ethmoids, dilatation of the naso-frontal duct, and irrigation of the frontal sinus, ameliorate the symptoms for a few months. In a large percentage of cases, the polypi and symptoms recur, and some form of treatment must again be instituted. In elderly people, or those with marked organic lesions of the heart, lungs or kidneys, a radical operation may be inadvisable. To all other patients, a radical operation is proposed, if they desire to be permanently rid of their disease.

Second.—A radical operation is indicated in severe acute exacerbations of the chronic disease, whenever any of the graver

symptoms, as mentioned in VII, VIII, IX or X, of Acute Frontal Sinusitis, develop.

Third.—If intranasal treatment of a frontal sinus does not suffice to prevent the discharge from passing to the antrum, and the odor and taste of the fetid discharge from the latter, annoy the patient, then, in order to cure the antrum, the frontal sinus must be operated upon radically.

Fourth.—Very large frontal sinuses, with multiple septa, particularly those with recesses extending back over the roof of the orbit, can be but imperfectly irrigated. Until recently, we have had no means of ascertaining these facts. Skiography, however, as now practised, will give us the exact height and breadth of the frontal sinuses, indicate the number and position of the septa, and, in many cases, inform us of the presence of an orbital recess. The radical operation should be advised for such patients.

Fifth.—Patients with narrow nasal cavities offer greater difficulty in carrying out intranasal treatment, than those with more patent nares. When the drainage is poor and headaches frequent, these patients gladly submit to a radical operation.

Sixth.—There is a large class of patients, living at some distance from the larger cities, who journey thence to get relief from their suppuration. Considerable sacrifice is entailed in their absenting themselves from home and business. They desire to be cured, and that as quickly as possible. Intranasal treatment is slow, and the results uncertain. A radical operation may take as long to affect a cure, but when obtained, it is permanent.

Seventh.—The neurasthenic patient, who is prostrated each time intranasal treatment is attempted, and rarely submits to enough being done at any one time, to make much progress, is more satifactorily treated by the radical method. There is seldom any pain after the second dressing, by the latter method.

Eight.—If a fistula is formed, leading into a frontal sinus, a radical operation is the only treatment likely to effect a cure.

My experience with radical operations on the frontal sinus has been limited to two types of operation.

OGSTON-LUC OPERATION.

I have performed this operation upwards of twenty-five times. In fully half the cases the patients had a recurrence of

the sinusitis, when polypi recurred in the nose, or after a more or less severe attack of acute rhinitis. The deformity, in this type of operation, is practically only a linear scar, which after a few months, is scarcely visible. The objection to the operation, is the great number of recurrences, owing to the fact that the mucous membrane in the frontal sinus is not removed, and the cavity remains lined with a secreting membrane, which participates in all the acute inflammations that occur in the nose. While the naso-frontal duct is at first widely dilated, constrictions occur at or near its lower end, which necessitate either intranasal operations for relief, or a second radical operation. My belief is that the Ogston-Luc operation gives the patient but little better chance for complete recovery than does an intranasal operation.

In seeking for a better operation, my attention was called to Kuhnt's method. This, as originally proposed, consisted in removing the entire anterior wall of the frontal sinus, thorough removal of the mucous membrane from all parts of the cavity, and the exposure and removal of the mucous membrane from the ethmoidal cells surrounding the naso-frontal duct. He then inserted a drainage tube through the duct into the nasal cavity, and closed the external wound, so that secretion during the process of healing, should find its way through the drainage tube into the nasal cavity. Having in mind the mastoid operation, it occurred to me that it were better to omit nasal drainage and closing of the frontal wound, and try to accomplish that which is so well done in the mastoid, of allowing the granulations to fill the lower portion of the naso-frontal duct, and to keep the upper portion packed with gauze until the cavity is completely obliterated. By so doing, one keeps the healing process entirely under the eye, and when the healing is accomplished we feel confident that the sinus is obliterated, and cannot be infected from the nose with every attack of acute rhinitis.

Before resuming the method, which is best known as the "open method" of operating, mention should be made of Killian's operation. You are all perfectly familiar, as I am, with the technique. I have performed it, as he describes it, several times upon the cadaver. The testimony from those who have witnessed the operation, varies as to the amount of deformity which is left by this procedure. The results of the "open method" have been so satisfactory, that I have not as yet, attempted the Killian operation upon any of my patients.

THE OPEN METHOD.

The patient is anesthetized beginning with nitrous oxid, followed by ether. If asthma or chronic bronchitis are very marked, chloroform is preferred. The skin over the forehead and rest of the face is sterilized by scrubbing first with green soap, and later washed with bichlorid, followed with alcohol and ether. In performing this, care must be taken to protect the eyes with a pledget of sterile gauze to prevent the various solutions getting into them and setting up a disagreeable conjunctivitis. A wet bichlorid towel is placed around the head so as to include all the hair and yet leave a large area of the forehead uncovered for purposes of manipulation. The best position for the operator is that directly behind the patient; the assistant who holds the retractor should be on the operator's left when the right frontal sinus is operated upon and on the right when the left cavity is operated upon; the assistant who sponges, stands on the opposite side of the operator to that of the one holding the retractor. The eyebrow is not shaven.

The incision begins at the junction of the nose and eyebrow, extends outwards, splitting the middle of the eyebrow and terminating in the outer quarter. It is most convenient to make the primary cut extend through the skin, fascia and muscular tissue down to the periosteum. Considerable bleeding is usually encountered at this point, but may be kept well under control if the finger of the disengaged hand of the operator is placed on the supraorbital artery before it enters the notch in the arch of the orbit. The periosteum is next incised, a quarter of an inch above, and parallel to the orbital arch. With an elevator the periosteum is denuded upwards for a space of an inch and down to the edge of the orbital arch. All blood vessels and bleeding points, usually from four to eight in the lower margin of the wound, are picked up with artery clamps; one or two clamps may have to be used on the upper surface of the wound. The vessels are immediately ligated, in order to prevent the artery clamps from pressing upon and injuring the ball of the eye. There should now appear the bare surface of the frontal bone exposed for a distance transversely of at least an inch and a half and vertically for an inch and a quarter. Blunt retractors should be used to keep this much of the wound exposed. With a Killian V-shaped chisel a groove is made in the bone on the anterior wall of the sinus

parallel with the arch of the orbit and one-sixteenth of an inch above it. Above this line one may remove the anterior bony wall extensively without great deformity, but if the bone below this is removed and the arch notched or destroyed, considerable deformity always follows. With gouge and mallet the anterior wall of the frontal sinus is grooved parallel to the aforesaid line and just above it beginning at a point near the nasal end, extending it to the middle of the orbital arch. By gradually deepening this groove and exercising care, one can usually expose the mucous membrane lining the frontal sinus without wounding the latter. When the mucosa has been exposed through an area one-fourth of an inch in diameter, the Cozzolini forceps are introduced into the cavity above the mucous membrane and the bony opening enlarged sufficiently to admit a bone forceps, such as Pyle's, Bacon's or any of those commonly used in a mastoid operation. With the exercise of a little care, the entire anterior wall of the frontal sinus may thus be removed without injuring the mucous membrane. Should any doubt exist as to the necessity for doing the radical operation, the first opening need not be made so large as this; the mucous membrane lining the cavity should be incised to determine its thickness and the contents, if any. The normal mucous membrane is about one-twenty-fifth on an inch in thickness. A diseased mucous membrane may be as much as ⅜ of an inch thick. One does not always find secretion in a frontal sinus thus opened because the space in the sinus is very much diminished as a result of the enormously thickened mucous membrane. The manipulative processes of keeping the field clear of blood by sponging and the pressure of the forceps often force whatever small amount of secretion may have been in the cavity through the naso-frontal duct into the nasal cavity. A probe is now used to explore all the periphery of the sinus for incomplete septa and the various pockets which so frequently exist. With a curette the mucous membrane in the body of the cavity is removed as far as the middle of the naso-frontal duct. A small pledget of gauze packed into the duct prevents hemorrhage below from obstructing the field of operation. All ridges, bony septa, and the margins of the sinus should be smoothed off and careful search made for any further inequalities in shape in the sinus. The margins of the bony wound should be smoothed by curettes so as to bevel from above downwards, no rough portions remaining. At-

tention should next be directed to removing the mucous membrane from the naso-frontal duct; this can only be accomplished by the aid of artificial illumination, and the small lamps designed by the author, with the lens front, have served him better than any other form of illumination. It is the naso-frontal duct and the ethmoidal cells immediately surrounding it that demand the closest attention on the part of the operator; it is comparatively easy to completely remove the mucous membrane from the main portion of the frontal sinus; it is a matter of some difficulty and the exercise of considerable care to thoroughly eradicate every trace of the mucous membrane from the naso-frontal duct; search should be made in this region for an orbital recess running upwards, outwards and backwards over the roof of the orbit; such recesses are apt to be overlooked by the beginner. If undetected the operation will almost certainly fail to give complete relief. Another region to which especial care must be given is the nasal side of the naso-frontal duct. Very frequently an offshoot will pass up in this region towards the median line which may readily escape attention unless searched for. About half way down the naso-frontal duct elevations are frequently seen and if these be investigated, it will be found that the bone is very thin and when punctured exposes ethmoid cells which are very frequently diseased. These cells should be freely opened and the mucous membrane removed as thoroughly as that of any other portion of the frontal sinus. As a result of the thorough opening of the ethmoidal cells in this region, it is not uncommon to convert a narrow naso-frontal canal not over an eighth of an inch in diameter, into a wide space more than one-half inch in diameter. During this latter stage of the operation some blood necessarily passes from the nose into the naso-pharynx, but it has never been of such quantity as to cause any alarm on the part of the anesthetist or operator. We frequently pass a probe, threaded with gauze, from the frontal sinus through the nose out of the anterior naris and see-saw gauze through, so as to break down more thoroughly any small cells in the immediate neighborhood of the outlet of the naso-frontal duct. The entire cavity is now wiped dry from blood, carefully inspected to see if any spicule of rough bone exists which, if present, is smoothed off. The cavity is next packed with five per cent iodoform gauze one-half inch wide and double selvedge

edged. The gauze is packed into the bottom of the naso-frontal duct but not allowed to protrude into the nasal cavity and from there upwards until the space is entirely lightly filled. Two or three sutures are placed in the outer angle of the wound and the gauze left widely separating the inner margins of the wound so that on its removal all parts of the cavity may be readily inspected. The forehead is cleansed of blood and the towel removed from the forehead and an aseptic pad placed over the wound, held in position by a bandage.

AFTER TREATMENT.

The patient is returned to his bed, and in only a few instances has it been necessary to give morphin or other stimulant for the relief of pain or shock. In from 18 to 24 hours, usually on the morning of the day following the operation, the bandage and blood stained pad are removed. The surface of the wound is gently washed with a solution of bichlorid of mercury 1-5000. A fresh aseptic pad is placed over the wound and held in place by an adhesive strap. This I have found to afford sufficient protection from the entrance of outside germs and is far more comfortable that the bandage about the forehead. There is always some edema of the upper eyelid, and on the second day the edema is usually increased and the eye may be closed; boric acid solution may be used for bathing the outer surface of the eye. Should the aseptic pad be bloodstained, it is renewed one or more times before the 6th, 7th or 8th day, at which time the packing is removed from the frontal sinus. Some bleeding, mostly from the margins of the wound, occurs at this time; the cavity of the frontal sinus is gently wiped dry with sterile cotton, and iodoform gauze repacked into the cavity, again keeping the margins of the wound separated. Hereafter at intervals, varying from three to five days, according to the amount of secretion, the packing in the frontal sinus is changed. At the end of two weeks granulations have usually sprung up throughout the entire bony surface of the frontal sinus. At the end of three weeks the granulations in the margins of the skin wound are often excessive and are best trimmed off with scissors. About this time we may observe that the granulations have completely filled the naso-frontal duct. The surgeon has then to do with an open cavity lined with granulations and shut off from the nose below; the same as occurs in a mastoid wound fol-

lowing the closure of the opening into the tympanic cavity. Occasionally the granulations are weak and need stimulating with balsam of Peru, nitrate of silver or other similar substance. Packings are usually continued until the cavity has become small in size, when it is my usual custom to discontinue them and expect the opposing granulating surfaces to come together and unite. Occasionally a superficial pocket is formed with the evacuation for a few days of a small amount of secretion. If this happens, I enlarge the opening and curette lightly the interior of the cavity, repack for a short time, until again the granulations appear to be such as to be able to unite and obliterate the cavity. In a few cases we have found that the bone has remained bare in spots for more than three weeks. In these cases we usually find that the use of 5 per cent iodoform wool induces granulations over the bare bone better than the iodoform gauze.

In one patient the dura was accidently exposed from too vigorous curettage of the posterior wall near the median line. A pledget of gauze was placed over the opening and the rest of the cavity packed as usual. No outward symptoms developed, contrary to what I had been led to expect from the experience of some of our German confreres.

In three cases the opposite or healthy sinus was opened, twice on account of a very oblique septum and once as a result of too vigorous use of curette on the septum. In all these cases a separate piece of gauze was placed over the opening, before packing the diseased sinus and in none of them was the healthy sinus infected. A good skiagraph would have shown the septum and prevented the opening of a healthy sinus in two of the three cases.

PERIOD OF HEALING.

Of the 113 frontal sinuses, six healed in four weeks, 19 in five weeks, 41 in six weeks, 21 in seven weeks, 7 in eight weeks, five in nine weeks, six in ten weeks, two in 11 weeks, and two in twelve weeks. One remained a persistent fistula for nine months, and a second operation was required. In one the fistula persisted for 11 months, but finally healed without any operation. In one the fistula persisted for 14 months, was operated on a second time, and one patient, two and a half years after the operation, still has a fistula.

The average time of healing, therefore, neglecting the four

last mentioned, was six and one-half weeks, including them it was 8.7 weeks.

The duration of the treatment is a matter which cannot be accurately foretold from the size of the sinus. Other things being equal, the smaller the sinus, the quicker one would expect it to heal. This has not always been the case. Some of the small sinuses have been nine and ten weeks in healing, while one of the largest sinuses healed in seven weeks. My impression is that in patients suffering from asthma, bronchitis, and multiple polypi formation in the nose, the sinus heals considerably more slowly than is the case in many other patients.

DEFORMITY.

Deformity by the "open method" of operation varies considerably from one that is scarcely noticeable in a person with a small frontal sinus and heavy eyebrow, to one that may be considerable, where the sinus is very large, and especially, if it is deep. In the earlier operations that I performed, the entire anterior wall was not removed. A small ledge was allowed to project over the sinus. The deformity consequent upon this method is, I believe, greater on account of the puckering at the site of the drainage, than when the entire anterior wall is removed, and the bone of the circumference of the frontal sinus bevelled from above downwards.

We have heretofore been afraid to inject paraffin, in order to overcome the deformity, fearing that the paraffin might cause a necrosis in the newly-formed connective tissue supposed to fill the sinus. As the result of the two secondary operations, we found that there was no connective tissue in the sinus; a deposit of bone had occurred, completely replacing the connective tissue. I shall attempt to correct the deformity by the paraffin injection method on some of my cases. It seems advisable to wait until the skin over the frontal sinus becomes freely movable, as it does in the course of six or eight months, after the healing has occurred.

RESULTS OF THE "OPEN" OPERATION.

From May 16th, 1901, until January 1st, 1905, I had performed this operation on 104 patients. Ninety-five had a single sinus involved, the right 52 times, the left, 43 times. Nine patients had a double frontal sinusitis. Thus, there were

in all, 113 frontal sinuses operated upon. Of the 52 right frontal sinuses, 32 were in males, and 20 in females; of the 43 left frontal sinuses, 27 were in males and 15 in females. Of the nine double operations, two were in males, and seven in females. Of the 104 patients, 101 had their frontal sinuses obliterated, as a result of a single operation. One patient, Mrs. A. B., age 65, double frontal sinusitis, operated upon two and a half years ago, still has a fistula, with very little secretion, a drop a week. Two patients have each been operated upon twice.

One patient, Mrs. J. H. S., double frontal sinusitis, right side healed, left side continued to secrete for nine months, after which time I opened the sinus again, and found an area of polypoid tissue around the upper portion of the naso-frontal duct, where I had probably failed to remove all of the mucous membrane. As the result of the second operation, the patient had a complete recovery.

The third patient, Mr. P. T. B., age 36, right frontal sinus apparently healed, when three weeks later a fistula formed on the forehead and discharged muco-pus. Light curettage was followed by apparent healing. The breaking down and healing recurred every three or four weeks, until fourteen months after the original operation, the cavity was again explored, and some portion of the mucous membrane found at the upper inner angle of the frontal, and also in the naso-frontal duct. This case is apparently healed now. In all three of these patients, it was possible to pass a probe from the nose, through the naso-frontal duct, into the sinus, to the same distance that it was possible before the operation. The obliteration, therefore, of the naso-frontal duct had not been accomplished in them.

Two patients have died since their frontal sinuses healed. One, Mrs. I. D., age 27, first seen February 9, 1904, had multiple polypi in both nares for five years, severe asthma, chronic bronchitis and emphysema, great frontal headache. Polypi removed intranasally and naso-frontal duct dilated, frontals irrigated, no relief. March 21st, chloroform anesthesia by a professional anesthetist on account of pulmonary lesion. Both frontals operated on radically by open method. Considerable cyanosis during operation, very blue during last half hour. Right frontal sinus, operation lasted 25 minutes; left frontal, 50 minutes. Patient rallied well and left hospital for home 35 miles away 48 hours after operation.

April 30, right sinus healed. May 7, left sinus healed.

May 12, operation on antra, chloroform anesthesia by same anesthetist. Anthesia began at 2:05 p. m., and completed at 3:45 p. m. Same cyanosis as at first operation. At 3:55 patient was in room and partly conscious. I saw her at 4:10, at which time she was conscious, pulse 130, respirations somewhat labored, pupils normal. Patient left in charge of anesthetist. I had no sooner left than pulse became very feeble. Stimulating enema ordered, but before nurse could give it patient died at 4:15 apparently from effects of chloroform. As the antra alone were operated upon, there could have been no possible cranial lesion produced during the operation.

The other case, Mr. E. C. E., age 39. Frontal headache, very severe at times, with edema and redness of left upper lid, profuse discharge from L. N. Three years standing following grip. Intranasal treatment for six months without much relief. Operation October 31, 1904. Very large L. frontal, with orbital recess, ethmoids and antrum. Left hospital November 9th and came to office for treatment. November 28, had attack of pleurisy with effusion, confining him to his house in Brooklyn. On December 12 patient resumed visits to office. Very little progress in healing. Healing continued slow until February 2, when frontal wound closed—antrum not yet filled up. No nasal discharge. The latter part of February, 1905, patient contracted a lobar pneumonia and died on March 6, 1905. No autopsy.

Seven healed cases have reported at various times, with involvement of some of their accessory sinuses. The frontal sinus has always been carefully investigated, but so far as I could determine it was not involved.

1. Miss A. C., age 29. Left frontal and antrum operation January 22, 1902. Had post-nasal discharge in September, 1902, again in February, 1903, and in June, 1904. Left sphenoid acutely inflamed. Cavity irrigated, discharge ceasing in two weeks. Was seen in the interval and nose clean.

2. Mr. P. J. W., age 34. Right frontal and antrum operation March 14, 1903. Still has fistulous opening beneath cheek. No nasal discharge.

3. Mrs. J. F. B., age 37. Multiple polypi; pansinusitis, five years' standing. Left frontal, antrum and ethmoids operated on January 21, 1904. Right frontal, ethmoids and antrum on March 23, 1904. In the latter operation no trace of frontal

sinuses could be found. Left antrum and sphenoid discharge occasionally. R. sphenoid has polypi formation about ostium, these were removed in October, 1904, and again in May, 1905.

4. Mr. P. R., age 57. Sphilitic history. Double frontal sinusitis with pus in both maxillary sinuses. Only frontals operated on. Pus disappeared from R. antrum after frontal operation. In February, 1905, had hard cold and both antra discharged very foul—smelling pus for one month. Cured by irrigation. Left sphenoid, although anterior wall had been removed so that ostium was nearly one-half inch in diameter, also secreted pus. Mucous membrane very thick and red. Now dry.

5. Dr. A. F., age 35. Left frontal antrum and sphenoid. Operation on left frontal and antrum November 1, 1904. Frontal healed. Antrum, small fistula still leading into mouth. Had acute rhinitis in April, 1905. Left sphenoid discharged for two weeks and right antrum also involved and had to be irrigated three times.

6. I. R., age 34. Left frontal ethmoid and antrum, operation on left frontal and antrum November 19, 1904. Very small fistula still in antrum. Had severe acute rhinitis April 15, developed severe acute right suppurative otitis media, paracentesis and discharge for six weeks.

7. C. S., age 23. Double frontal snusitis with discharge from sphenoid and polypi in choanae, seen from naso-pharynx. Operation on frontals December 19th, 1904. Ostia sphenoidali enlarged with forceps, polypi excised. March 29th, more polypi found around ostia and again removed.

To Recapitulate.—Of the 104 patients two are dead, one from chloroform narcosis, the other from pneumonia, one case has a fistula two and one-half years after the operation. Two required a second operation before oblitration of the sinus was accomplished. Thus 3 per cent of secondary operations were necessary to healing. Seven cases are still under occasional treatment, not for frontal sinusitis, however. Three of these cases were operated on so recently that there has not been time to correct the disease in the other sinuses.

XXVI.

THE INTRANASAL ROUTE IN OPERATING UPON THE NASAL ACCESSORY SINUSES.*

By Walter A. Wells, M. D.

WASHINGTON.

That the nasal passages can be utilized as a pathway to the attack of the diseased nasal accessory sinuses, depends upon the well known anatomic fact that all of these sinuses communicate with the nasal fossae by one or more openings or ostia, which though variable as they certainly are as regards their size, form, position and number, are constant as regards their presence, and further by the fact that all of the sinuses, with the exception of the frontal, are in relation to the cavity of the nose proper over an area of greater or less extent, which represents the common boundary wall between them.

Any method of treatment which aims to gain access to the sinuses, either through one of its natural openings, enlarging it if necessary, or the formation of an artificial opening, or by a still more extensive surgical destruction of an intermediary wall, may rightly, I think, be denominated the nasal, intranasal, endonasal or transnasal route.

Having been honored by the president of our Society with the agreeable commission of presenting the claims which can be urged in favor of the intranasal route for attacking the diseased nasal accessory sinuses, the author trusts that his advocacy of the cause will not be taken to mean that he practises the nasal route exclusively and considers it all sufficient for every kind of case.

On the contrary, he recognizes clearly enough that it has its objections and limitations, and must often be superseded by the so-called external operation.

The nasal route can, I think, properly be designated the conservative method, inasmuch as it aims to accomplish a cure with the least possible destruction of healthy tissue, and without producing any deformity, and as a rule without having resort to a general anesthetic.

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*Read before the American Laryngological, Rhinological and Otological Society, Boston, 1905.

A mistake, however, would certainly be committed if the conclusion were reached that because conservative it requires less skill or anatomic knowledge inferior to that necessary for performing the more radical operation; for that is not the case. As we are operating in a more confined space than in the external operation where the operative field is generally enlarged, we shall have consequently greater necessity for depending upon the surgeon's *tactus eruditus;* and for the same reason, a thorough knowledge of the normal anatomy of the parts, and possible abnormalities to be met with is absolutely indespensable.

Recently there has been such activity in devising and experimenting upon new methods of attacking these sinuses from without, and so much attention has been centered upon methods of opening up one sinus to gain access to another, and upon those ultra-radical operations which seek the complete obliteration of the cavity at the cost of the wholesale suppression of the sinusal walls, that we are, it may be reasonably suspected, in a fair way to lose sight of the fact that there is such a thing as a nasal route.

Before we advise a patient to submit to an operation under a general anesthetic, with its possible accidents or to one that entails a risk of orbital complications, such as strabismus, or that will leave an ugly facial deformity, should we not consider calmly, carefully and conscientiously what can be accomplished by a more conservative course?

The objections which I have at one time or another seen or heard raised against employing the nasal route in the treatment of the accessory sinuses, may be summarized as follows:

1. That it is not always practicable.
2. That valuable time is lost postponing radical measures.
3. That the nasal methods are generally slow and tedious.
4. That they are uncertain as to results.

To answer these objections *seriatim,* we will say in regard to the first, that the nasal route is not always practicable—that if there are certain cases in which the treatment is not practicable, there are others where it is, and that the latter will be found to increase, and the former diminish in proportion to our efforts to put this method into effect.

2. The second objection, viz.: that valuable time is lost in postponing radical measures, is the one most commonly urged

against conservative nasal treatment. Supposing the nasal treatment to have failed in making a definite cure, is the time actually lost in employing any method which consists in the frequent removal of purulent secretions and thus succeeds in relieving the patient at least of the most disagreeable symptoms? Moreover, even though the case must come ultimately to a more radical operation in order to effect a perfect cure, the nasal treatment has in all probability accomplished something which contributes toward a successful outcome, such as the removal of polypi and hypertrophies, and the establishment of better nasal drainage.

In the case of intranasal treatment of maxillary sinusitis, if done in the manner which I shall later describe, we will have actually performed one of the stages of the radical Caldwell-Luc operation, which will prove a decided advantage, should this operation become eventually necessary.

3. The third objection, that the nasal operations are slow and tedious, has to be admitted as generally true, though not always. The only question here is whether the relief afforded or the chance of cure outweighs all the disadvantages of the external route.

4. This brings us finally to the vital question of the efficacy of the nasal route, a question that is involved is the fourth and last objection, viz., that the nasal route is uncertain. Being uncertain, it is argued, it were best to proceed at once to measures that can be better depended upon for successful results.

That a great many cases do get well under conservative treatment will be generally admitted. These cases, moreover, are often such that, according to all rules, seemed to demand radical measures.

Many specialists have borne testimony to the fact that cases in which they expected to operate, have surprised them by recovering under simple treatment, undertaken tentatively, or because the patient himself held out against more radical measures. The uncertainty in the results, then, instead of being an objection, is an argument in its fiavor, because we ought to give the patient the benefit of the doubt, before proceeding at once to a radical operation, which the outcome may prove unnecessary.

Some will say, differentiate your cases. The nasal routes will do very well for your mild, simple, acute cases; but when

it comes to a chronic case, in which extensive changes have been wrought in the lining membrane and bony wall of the cavity, your conservative measures are useless, and you must proceed at once to radical methods. These are good principles certainly; but how to apply them, there is the difficulty.

The chronicity of an existing sinusitis can be judged only from the history of the case, and is therefore unreliable. The patient may mislead you into mistaking for a recent case, what is in reality a recrudescence of a long standing, latent inflammation of the sinus, or *vice versa* into taking to be chronic, what is in fact recent, because the patient confuses the present symptoms with the symptoms of ordinary acute rhinitis which he has had in the past.

The state of the interior of the cavity as a guide to a choice of operative method is of course practically unavailable, unless in the case of the maxillary antrum, where some attempt has been made to distinguish between, on the one hand, an acute sinusitis or simple empyema without thickening in the lining membrane, and on the other a true sinusitis, in which the capacity of the cavity has been contracted by hypertrophic and polypoid degeration in the lining membrane.

We have for this purpose the following three signs:

1. *Mahu's sign.*—Mahu punctures the antrum, injects into it a fluid, then withdraws and measures it. If the capacity proves to be greater than 2 cm. he concludes that we have to deal not with a true sinusitis, but with a simple empyema.

2. *Lubet-Barbon's sign.*—According to Lubet-Barbon, a true sinusitis may be inferred, if after a thorough washing out of the sinus, drops of pus will continue to flow through the canula, allowed to remain a few minutes in place.

3. *Guisez's sign.*—The easiest to apply, and the most reasonable is the sign of Guisez. It depends upon the principle that polypoid thickening in the mucous membrane, no less than the presence of pus, may account for a failure to get illumination in a diseased antrum. If then an obscurity that was present before, disappears after emptying the sinus of pus, he infers that we have to deal only with an empyema, and not a true chronic sinusitis.

If after applying one or more of these tests we can establish with a reasonable certainty, that the case before us is a true sinusitis, and that chronic polypoid changes have already taken place in the interior of the cavity, an immediate radical opera-

tion is indicated. In all other cases, the nasal route should be given a trial, and if it fails no harm at least has been done.

The nasal route recommends itself as the natural one. An outlet is secured for the diseased secretions through a channel, which constitutes the natural outlet for secretions under normal conditions, and for this reason it is far more convenient and agreeable to the patient than any other.

After all, whether we approve of the nasal route or not, the circumstance that our patients will sometimes refuse to undergo a radical operation from one consideration or another, make it imperative for us to practice it, and therefore I beg your indulgence while I as briefly as possible, outline the nasal route for the individual sinuses.

THE MAXILLARY SINUS.

In a large proportion of cases antrum disease is undoubtedly of dental origin, but in such cases attention must be primarily directed to the diseased tooth or teeth and then the alveolar route naturally takes precedence over all others.

We are considering here, however, that other group of cases, not dependent upon the condition of the teeth, but whose inflammation analogous to those of the other sinuses are of nasal origin.

The nasal route to the antrum of Highmore includes:

1. Irrigation through the natural opening (ostium maxillare or ostium accessorium.)

2. Irrigation through an artificial puncture with trocar in either middle or inferior meatus.

3. Large opening in outer wall of nose.

1. Irrigation through the natural opening, although recommended and practiced in the past by such eminent men as Lichtwitz, Garel, Hartman, Stoerk and Weil, has, I think, too many disadvantages and too few advantages to deserve to be considered as a method of treatment. The opening being near the roof, it is not practicable to effect a thorough cleaning of the cavity. Thick, grumous matter which has sunk to the bottom will not be stirred up and the cleansing will be only superficial.

If there be no accessory opening, the pus will have no place to make its exit, except around the sides of the canula, which obviously may prove quite insufficient.

2. *Artificial opening with trocar.*—Some authors have practised puncturing through the middle meatus, for the reason that

here the outer wall of the nose is thin and membranous, and the trocar can be made to enter with less force.

But besides having the same disadvantage as the natural opening, viz., its high position, an additional objection exists in the danger of puncturing the orbit in this locality. The outer wall of the nose in the region of the middle meatus sometimes is so fused with the inner orbital wall that a needle entering here is quite certain to enter the orbit. The puncture should, therefore, be made in the inferior meatus, thus avoding these inconveniences.

Mickulicz was the author of the method of treating the antrum by means of a puncture in the inferior meatus. Krause was also a strong advocate of this method and invented a trocar for the purpose.

The point of the needle should be inserted a little behind the middle of the anterior posterior distance of the nose, and well up under the attachment of the inferior turbinate if we desire to select that part of the inferior meatus where the wall is thinnest.

Curtis (Trans. 9th An. Meeting Amer. Laryng. Rhin. and Otol. Soc., Lexington, Ky., 1903) says the puncture should be 1 cm. behind anterior attachment of inferior turbinate. This is too far forward. It should be from two to two and one-half cm. back of this point, in order to avoid the accidents which will be referred to later.

It is generally stated that treating the antrum through a small puncture with a trocar is unsatisfactory, because of the tendency of the opening to soon close. My experience has been otherwise. Before I had constructed the instrument which I will describe later, I treated quite a number of cases of suppurative inflammation of the antrum, using the Myles trocar or canula. To facilitate the introduction of the canula into the opening at subsequent sittings, I improvised a blunt, pointed, obturator to take the place of the sharp, pointed trocar, and I very seldom experienced any difficulty in finding the artificial aperture and utilizing it for the purpose of irrigation.

I recall one case in which this must have been done not less than 150 times.

The case is instructive in that it demonstrates what may sometimes be accomplished by persistance in the conservative course of treatment.

The patient, a young lady, first came under my care in

August, 1902, suffering from a left frontal sinusitis. After several months irrigation, the liquid injected into the frontal sinus returned clear; but finding nevertheless pus in the middle meatus, I suspected antrum disease, and punctured.

After having irrigated the antrum through the artificial opening in the inferior meatus on an average of three times a week, and the pus still continuing to come, I proposed radical operation, but the patient preferred the symptomatic relief to the promised cure and refused. There was nothing to do but continue the irrigation, which was done sometimes twice a week, sometimes oftener, for full twelve months from the time the antrum was originally punctured. At last, to my surprise, the pus ceased to appear in fluid returned from the cavity, and a perfect recovery resulted.

It is now a year since; the patient has contracted some colds in the meantime, but there has been no return of the pus.

We may use either a straight or a curved needle for puncturing the antrum. It is not possible with a straight needle, to get the shank as near a right angle to the wall of the nose as is desirable, and there is consequently greater danger of the point sliding back and failing to enter. If a curved instrument is used, the point ought to be applied a little further back than when the straight is used, on account of the greater danger of entering the opposite wall of the antrum.

If the trocar has entered the sinus, we become aware of it by the following signs:

(a) The operator experiences through the sense of touch a crepitation from the breaking through of the thin bony wall, and a feeling of having suddenly overcome an obstruction and plunged into a cavity.

(b) The patient's sensation can also be relied upon of the instrument being in the cavity; especially if he has a pain directly over the root of the teeth.

(c) The instrument becomes fixed, the shank being pressed firmly against the anterior edge of the septum.

(d) If pus be present, some drops may flow through the canula.

(e) The conclusive evidence is the appearance of pus when the cavity is irrigated.

Difficulty may be experienced because of unusually thick walls, or the presence of pus or deviations in the septum, or of a low reaching turbinate; but they are such as may be

overcome. A division of the sinus into two cavities may be misleading. Where suspected, a second puncture should be made farther back or forward as the case may be. A fusion of the outer wall of the nose with the orbital plate is an anatomic anomaly which may lead to unpleasant consequences. This as a rule is a serious consideration only when the puncture is in the middle meatus. But exceptionally it may be so marked as to cause an accident, even from a puncture in the inferior meatus. Dr. Beamon Douglas reported a case, evidently of this class, in which the puncture was followed by a swelling in the orbital region, the eyes becoming closed from the edematous condition in the lids.[1]

The facial plate may also become fused with the outer wall of the nose, in which case the antrum is very much narrowed in its anterior part, and there is danger of the needle going all the way through, and piercing the cheek. Puncturing well back as advised will circumvent this accident.

We should always study the conformation of the face before making these punctures, especially with reference to a bulging outward of the outer wall of the nose, or a flattening in the malar region, and we may gain information that will save us from accidents of this kind.

3. *Large opening into the outer wall of the nose.*—Although this is practised regularly as a part of the Caldwell-Luc operation it is seldom that it is done as an independent procedure.

Rethi (1896), Bayer, (1899), Kaspariantz (1900), and quite recently Onodi have advised treating maxillary empyema by means of a large opening in the middle meatus, the naso-antral wall being thinner at this part of the nose.

Claoue of Bordeaux in 1902 (*Semaine Medicale,* October 15, 1902) advised making a large opening in the inferior meatus, instead of the middle. He used originally a drill driven by an electro-motor for the purpose, but later gave this up because of the painfulness of the proceeding, and adopted a hand-drill and special forceps to make the opening. Curtis at the eighth meeting of this society in 1903, spoke favorably of a large opening through the outer wall of the inferior meatus, which he made by means of burr drill driven by an electric motor. Escat (*Toulouse Medicale,* April 15, 1904) uses a sort of rectangular trocar to enter the antrum, and enlarges

1. B. Douglas—Accident with an antrum trocar. N. Y. Med. Jour., 1904, LXXX, 1077.

the opening by means of special hooks. The flaps thus cut in the outer wall, are then removed by means of a snare or cutting forceps. Escat has reported cases of 1, 2, 3, and even 5 years' duration cured by large openings through the inferior meatus.

Gavello of Turin (Sulla cura chirurgica delle sinusite mascellare cronici, *Cior. d. r. Acad. di Torino,* 1904 4s. X 322) in a recent article also advocated the large opening and has devised an instrument for making it.

There is no illustration of this instrument accompanying the article, but it is described as a trocar on the principle of Naegele's craniotome. After puncturing with this, he enlarges the opening by means of common bone forceps.

The operation of making a large opening through the inferior meatus seems certainly to be a very rational one. We thus establish a communication with the nose at the lower part of the cavity, provide good drainage, and permit the diseased sinus to be aerated and irrigated *ad libitum;* and the secretions being evacuated by way of the nose give far less discomfort to the patient than were the case should the opening be in the alveolar process or canine fossa. Furthermore, as already once stated, if ultimately the Caldwell-Luc operation must be performed, one stage of the operation will already have been accomplished.

It occurred to me that there was a need of some simple method of making this large opening. For this purpose, I have constructed the instrument which I show you. (Fig. 3.)

In the first place, it consists of a trocar and canula, having a curve representing the arc of a circle as in Myles' instrument, but of considerably greater calibre. I have added a blunt obsturator, but have discarded the little connecting piece which Myles fits into the canula in irrigating.

The chief feature of the instrument is the small plate on the concave side of the canula, containing a rasp, intended to cut away the edge of the opening and thus enlarge it to the diameter desired.

Before making the large opening into the outer wall, any polyps which may happen to be present should be thoroughly removed, and the inferior turbinate cut away sufficiently to give good access to the naso-antral wall in this locality. With a pair of serrated scissors, the turbinate is cut away close to its attachment to the wall for about one-half or two-thirds

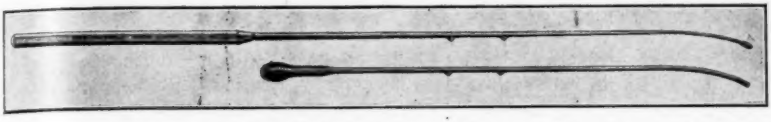

Fig. 1. Author's Sphenoid Sinus Probe and Canula.

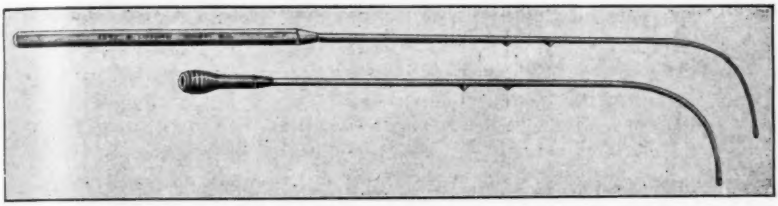

Fig. 2. Author's Frontal Sinus Probe and Canula.

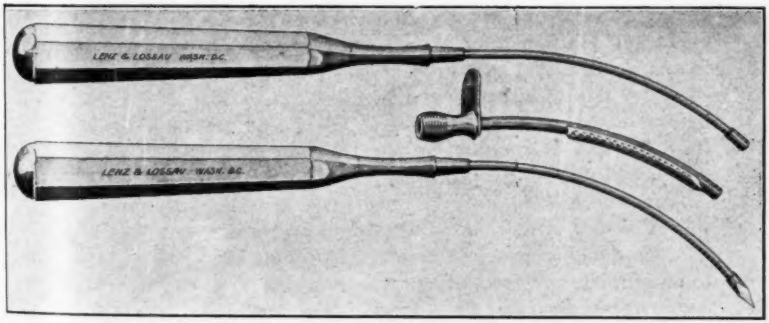

Fig. 3. Author's Special Trocar and Canula for Making Large Opening Into Antrum Through Naso-Antral Wall.

of its extent, after which with wire snare this much of the turbinate can be very easily severed and removed. After having thoroughly satisfied ourselves of the presence of pus in the antrum, we can proceed to make the large opening by means of the special trocar described. The point of the trocar is inserted well back about the junction of middle and posterior third of the inferior meatus; and in case a local anesthetic is used, well up under the attachment of the inferior turbinate where the antro-nasal wall will be found thinner. If done under general anesthesia, the opening might as well be made near the floor of the nose, thus obtaining the most desirable point possible for drainage. As soon as the instrument is felt to have entered the cavity, the blunt obturator is substituted for the trocar, and the rasp made to enlarge the opening in a generally forward direction to the extent of a couple of centimeters or more.

The accompanying photograph shows the size, form and location of the opening, which may be made with this instrument.

THE ETHMOID CELLS.

There seems to me rather more definite indications to guide the operator in the case of the ethmoid than of the other sinuses. Most authors are agreed as to the advisability of attempting a cure by operations through the nose when there is but a mild state of inflammation present, or when the disease is circumscribed and limited to but a few cells. Where orbital symptoms are present, and the patient presents himself with an abscess or fistula in the region of the os planum, the external operation will generally be necessary. In all cases some preliminary intranasal operation at least will generally be necessary, for before attempting immediate external operation, the natural course is first to remove polyps and polypoid hypertrophies, and thoroughly cleanse the nose of purulent secretions and establish good drainage.

If it is decided to push the intra-nasal treatment any farther, the next step is to remove the middle turbinate. When this is done, polyps previously concealed and hardly suspected to be present, will frequently come into view and give us more employment for the wire snare. The intranasal operation must proceed by slow successive stages, because of the bleeding which generally obscures the field and interferes with a good view of the parts.

Many different instruments have been devised for breaking down the ethmoid cells.

Hajek uses a trocar and hook. Grünwald and Myles have devised forceps and Bryan a curette for the purpose. The Luc cutting forceps have seemed to be the ideal instruments. They are very effective in biting off portions of the labyrinth seized by the blades, and the shanks being slender, they obstruct the view as little as possible.

The use of the electric cautery is to be condemned because of the reaction with which it is followed; and punching instruments, trocars, drills and electric trephines ought to be avoided because of the danger of their being unexpectedly thrust either upward through the cribriform plate or outwardly through the lamina papyracea. With whatever instrument one may be working extreme caution is required.

There is considerable variation in the volume of the ethmoid labyrinth, and the endeavor to effect a complete removal of the cells is attended with the danger of penetrating one or the other of the two structures mentioned.

Using monocular vision, an imperfect idea of distance is very easily obtained, and the operator should frequently remove his instrument and make a mental estimate of the distance within the nose reached by the end of the instrument when in place.

I think it is worth while to recall the fact that the cribriform plate is fully one cm. below a line that is on a tangent with the upper border of the superciliary ridges and that one in operating should always keep below a horizontal plane at the level of the internal angular process or inner canthus of the eye.

It is often a question to determine what tissues are so diseased as to require removal, and what may be left. The probe may be of service as a guide to exposed bone or to such as is friable, and easily broken down. Membrane that is deeply colored, puffy, swollen and edematous, should generally be removed. In case of doubt, it is the part of wisdom to be conservative and let the progress of the case dictate as to further intervention.

The advantages of the nasal route when feasible, are that it opens the cells at their most dependent situation, it is attended with a minimum of surgical intervention, and that it avoids disfiguring external scars.

THE FRONTAL SINUS.

The external operation upon the frontal sinus, especially those which aim at a complete obliteration of the sinus are sometimes attended with such a hideous deformity, that whatever may be our own inclinations with respect to its indications in a given case as compared with conservative intranasal treatment, the patient will frequently decide the matter by refusing to consent to its performance, thus compelling us to adopt the only alternative.

When we consider that at any rate the radical cure of frontal sinusitis is far from having attained the position of an accepted finality, we are the more disposed to yield to the patient's own wishes and give the conservative treatment at least a trial.

Hajek in the recent edition of his unexcelled treatise on the accessory sinuses (Pathlogie und Therapie der entzümdlichen Erkrankungen der Nebenöhlen, Leipzig and Wien, 1903, page 177) shows unusual respect to the endonasal method of treatment and gives expression to such favorable views of its usefulness, that they deserve to be noticed.

He lays special stress upon resection of the anterior end of the middle turbinate and removal of polyps, etc., from the neighborhood of the nasal end of the ductus naso-frontalis, which not only in acute cases he says, or acute attacks in the course of a chronic empyema, but in the chronic cases themselves constitute a therapeutic expedient of the very highest value, so long as deep-seated muco-periosteal degeneration or destruction in the bony walls of the cavity has not already taken place.

He recognizes that his views are in direct opposition to the prevailing sentiment among contemporary rhinologists, but he argues their rationality and supports them from clinical experience.

Three methods have been used of approaching the frontal sinus by way of the nose:

1. Simple irrigation through the natural opening.
2. Drilling through the anterior-superior wall.
3. Enlarging the naso-frontal canal.

Irrigation of the sinus by way of the infundibulum is a perfectly practical procedure in a large proportion of cases.

Anatomic studies like those recently made by Mosher of

Boston, have been of great value in familiarizing us with the anomalies, as well as the normal relations of the structure in this vicinity. Some authors are inclined to discredit the practicability of probing the sinus through its natural opening. In a few cases the canal being unusually constricted or long and tortuous, it is impossible. In most cases, a resection of the anterior end of the middle turbinate will be required to give free access to the infundibulum; but in quite a number of patients this is rendered unnecessary by reason of the fact that the naso-frontal duct, instead of being continuous with the hiatus semilunaris opens by a wide orifice directly in front of its anterior upper extremity.

In regard to the technique of the procedure, permit me to quote from a previous article (*The Laryngoscope,* St. Louis, April 19):

"Using the uncinate process as a guide (resection of the anterior end of the middle turbinate having been previously done in some cases) to begin, we apply the beak of the probe well back in the hiatus and draw it upward and forward in the direction of the sinus at the same time that the handle is depressed. If it does not slip easily into the cavity, after tentative modification in the curve, do not use force, but holding the probe always lightly in the hand, reintroduce and feel for the ostium a little in front of the upper extremity of the hiatus."

Error most easily results from supposing that the probe has entered the sinus when it has entered an ethmoidal cell. As a rule, the openings to these cells are placed externally, and the point of the instrument is more certain to enter by being turned slightly toward the median plane.

The beak of the probe should have a curve of about 90 degrees at about three cm. with a slight additional curve a few millimeters from the extremity. The probe originally employed has been slightly modified. It is made a trifle more rigid than formerly, and having already the curve, recommended as being right for a majority of cases. It is flexible enough, however, to permit of whatever modification of this curve may be necessary for the individual case. I still hold to the straight shank, instead of one of a sigmoid curve advised by some authors, as it is only with the former a proper idea may be had of the angle of inclination of the shank, an important re-

quirement in an orientation with respect to the entrance into the sinus.

If the sound or canula be in place we will be aware of it by the following signs:

(a) It will have penetrated to a distance between six and seven cm. from the anterior nasal spine. (Six cm, when at the floor of the sinus and seven when fully into the cavity.)

(b) The direction of the shank should be such that it makes an angle of 30 to 35 degrees with the floor of the nose.

(c) The beak of the probe will be pointing directly forward, as shown by the indicators on the handle.

(d) The beak being free in the cavity, is capable of considerable excursion from side to side, as shown by the rotation of the handle upon its axis.

(e) Pus will flow along the shank of the instrument. In case of the canula, insufflation or irrigation will bring pus to light, a previous thorough cleansing of middle meatus being understood.

2. The operation of drilling through the roof of the nose to reach the frontal sinus as proposed by Schaffer, cannot be too strongly condemned. The difficulties of entering by this route and the danger of penetrating the cribriform plate must be apparent to any one who is in the least informed as regards the anatomic relations in this locality. Spiess recommended controlling the operation by means of the skiagraph, a procedure endorsed also by M. Schmidt. Even with this safeguard, the end gained is not worth the risk and trouble.

3. A more rational procedure is that recently described by Ingals, consisting in the enlargement of the naso-frontal duct by drills, especially devised for the purpose.

The region of the middle meatus being previously cocainized, a flexible pilot is introduced into the infundibulum, over which is passed a hollow burr operated by a dental engine. The surrounding tissues are protected by means of a flexible shield. Ingals claims to be able with this instrument to successfully enlarge the canal to a diameter of six mm., after which he introduces a small sharp ring knife and curettes the mucous membrane about the ostium frontale. The canal is packed with gauze, which is allowed to remain in place four or five days. Chlorid of ethyl anesthesia was employed in performing this operation.

It is unnecessary to state that all intra-nasal methods in-

clude a thorough removal of polyps and polypoid hypertrophies, and of spurs or other pathologic conditions which obstruct the naso-frontal canal and interfere with drainage.

THE SPHENOID SINUS.

It is only a few years ago that the first efforts were made to gain access to the interior of the sphenoid.

The subject was early taken up in this country and we are particularly indebted to Myles, Bryan, Wright and more recently to Coakley, Henkel, Curtis and Berens for valuable contributions demonstrating the possibility of rational surgical treatment of its diseases.

Various methods have been devised of attacking the sphenoid, so that we have the fronto-ethmoidal, the orbito-eth moidal, the maxillary, the intra-nasal and the naso-pharyngeal route, and the various operations of Rouge, Oelier, Verneuil and Chalot, Baudenhauer and Garel, Moure, Furet and Jansen.

Without going into detail as to various other methods, we may say that the intra-nasal route commends itself as being the most direct, and most conservative method and as being the route which has been already utilized to diagnose the condition and will probably be utilized in completing the cure and because it avoids deforming cicatrices and the exposure of other healthy sinuses to possible infection.

The intranasal method consists in irrigating the sinus through its normal opening, or by breaking down over a greater or less extent the anterior wall and curetting the interior of the sinus. The natural opening is situated on the anterior wall near the roof and somewhat outward, so that it is seldom visible by anterior rhinoscopy.

It is oval in shape, with its largest diameter vertical and measuring three to five mm. but somewhat narrowed by folds of mucous membrane.

The distance of the antrum from the anterior nasal spine has been variously estimated from five cm. to nine cm., which represent respectively too low and too high estimates to serve as an average.

My observations agree with those of Coakley, who puts the distance at about seven cm.

On the probe and canula which I use for sounding and irrigating the sinus, I have put two small indicators, one at seven, the other at eight and one-half cm. from the point, the

former to mark the distance from the anterior nasal spine to the situation of the ostium, and the latter to mark the distance upon the handle when the probe has successfully entered the sinus. The probe should be slightly curved near the end, in order to reach the ostium which, as stated, is placed a little laterally. This curve can be made to serve a purpose, as I have discovered, in ascertaining whether or not the probe has successfully entered the cavity.

For if guided by the indicators on the handle, we first turn the point upward, it comes in contact with the roof, when it has entered the sinus but a slight distance and cannot be pushed farther; if now the point be turned downward, it becomes free, and the probe can be generally entered an additional cm. or more, until the point comes in contact with the posterior wall. (Fig. 1.)

To sound the sphenoidal sinus through its natural opening, introduce the probe, with the convexity of its curve above, obliquely upward across the juncture of the middle and posterior thirds of the middle turbinate, until its point meets with an obstacle which will be the anterior wall of the sphenoidal sinus. Now turn the point laterally and immediately or with a little groping the probe will glide through the ostium into the sinus.

In a majority of cases, it is necessary to resect the greater part of the middle turbinate. In cases of naturally small, flat turbinate, or where atrophic conditions exist, this expedient is rendered unnecessary. A deflected septum or large spur may sometimes also have to be overcome as a preliminary to a successful introduction of the probe.

One may know that the sinus has been entered by the following signs:

(a) The end of the probe will be distant from the anterior nasal spine from seven to eight and one-half cm.—in cases of extra large sinus, up even to nine and ten cm.

(b) The instrument becomes fixed; that is, excursion in all transverse directions, is rendered impossible; but it may be drawn back and forward and rotated to a certain extent upon its own axis, especially when the point is downward.

(c) The probe can be advanced from one to two cm. more, when the point is directed downward, then when upward.

(d) Post-rhinoscopic examination will show the probe properly directed for the ostium, and at least that it is not in the naso-pharynx.

(e) Pus may flow along the handle of the probe or if it be the canula inserted, the flow of pus from irrigation will give positive proof if its being within the sinus.

Extreme caution must be observed in irrigating the sphenoidal sinus, as strong and irritant solutions, or non-irritant solutions if introduced under pressure, are liable to set up alarming cerebral symptoms owing to the extreme attenuation of its upper wall, which may exist.

Boric acid or normal salt or a simple sterile solution may be injected under slight pressure, and having care that the canula does not so tightly fit the ostium as to prevent a reflux of the fluid, the patient inclines the head forward to enable the fluid to appear at the anterior parts.

The natural opening being near the roof, and there being no accessory opening as in the maxillary antrum, this method of treatment does not seem to give much promise of success. Nevertheless we have seen cases of acute sinuistis get well spontaneously, or under mere cleansing and depleting application in the post-nasal region, and it may be that a timely irrigation or so may occasionally be just sufficient to help to the *vis medicatrix naturae* to enable it to accomplish a cure, which alone it might have been unable to do.

As to the more radical measurement which look to the breaking down of some of the wall of the cavity, we need lose no time in the consideration of methods which aim to reach it by way of its floor.

The lower wall is too thick, and operations by this route are awkward, cumbersome and uncertain.

The anterior wall has the advantage of thinness and accessibility, and may be considered truly the surgical wall of the sinus.

Hajek attacks this wall by introducing his special hook through the ostium sphenoidale, breaking down its edges, which may then be removed with the forceps.

Moritz Schmidt employs a hand saw to take the place of the hook. St. Claire Thomson uses a long forceps which after being introduced through the ostium, are opened and thus enlarge the opening. Bryan, Coakley and others use a gouge or curette. Trocars, hand drills, electric motor drills or galvano-caustic electrodes, are in the writer's opinion unsafe instruments to use in this locality, because of the danger of enexpectedly penetrating the roof and entering the cranial cavity.

Whatever instrument be used, let the cutting be always downward and inward. Downward in order to keep away from the cranial cavity, and inward as we are thus less liable to have a troublesome hemorrhage from an injury of the sphenopalatine artery, which is located to the outer side of this wall.

Some operators (Henkel, St. Claire Thomson) prefer to have the patient under a general anesthetic, and be guided to the proper locality with one finger introduced into the nasopharynx, which is to be commended as a safe and rational procedure, especially in those cases where the view from the anterior nares is not particularly favorable.

Having made a sufficient opening into the anterior wall, a careful curettage may be necessary to remove granulation masses and fungosities from the interior; but it is best to avoid any curetting the roof which may at times be of the thinness of parchment, and easily penetrated, and to but very gently curette the sides because of the danger to the nerves and vessels which pass through the optic canal and sphenoidal fissure.

The interior of the sinus having been washed or swabbed with some antiseptic solution, may be loosely packed with gauze, which may be changed every day or so as the conditions require.

XXVII.

RESULTS OF OPERATIONS BY WAY OF THE MAXILLARY ROUTE FOR COMBINED DISEASE OF THE MAXILLARY ANTRUM, ETHMOID LABYRINTH AND SPHENOID SINUS.*

By T. Passmore Berens, M. D.

NEW YORK.

At the request of your President, it is the privilege and the pleasure of the writer to describe again the operation for the radical cure of multiple sinusitis, via. the maxillary route, when affecting the maxillary antrum, the ethmoid labyrinth and the sphenoid sinus. Jansen, Boeninghausen and Mouret have described operations for the radical cure of empyema of the antrum of Highmore, which are more or less similar in their technique. The operation used by the writer applies to the three cavities, the antrum, the ethmoid and the sphenoid, and is practically the result of following the technique of Jansen of Berlin. A brief outline of the operation, as described in detail at the last meeting of this Society (*Transactions* 1904, p. 89), will suffice.

Insert a post-nasal tampon and hold the tongue forward by a ligature passed through its tip. An opening is then made into the antrum through the canine fossa and enlarged until the antero-lateral wall is nearly completely removed. The bony naso-antral wall is then entirely removed, the mucous membrane on its nasal side being as far as possible preserved. The ethmoid cells and the turbinate process of the ethmoid are then removed. The sphenoid is opened, either through its ostium or through the posterior ethmoid cell; the opening is then enlarged until as much as possible of the anterior wall has been removed, and the cavity of the sphenoid is examined and its diseased contents removed.

The field of operation is illuminated by means of a headlight worn by the operator. Instrumentation is further aided by

*Read before the American Laryngological, Rhinological and Otological Society, Boston, 1905.

the insertion of the small finger deeply into the nostril. This combination of the seuse of sight with the sense of touch does much toward removing the feeling of uncertainty with which operations on the deeper structures of the nose are usually approached, and is a strong recommendation for the selection of this rather than the intra-nasal route. Bleeding during the operation is usually controlled by gauze tampons dipped in adrenalin solution, although a resort to artery forceps to catch the sphenopalatine vessels occasionally is necessary.

The writer wishes to emphasize the fact that this operation is designed especially for the relief and cure of those cases of chronic multiple sinusitis involving the antrum and ethmoid, or antrum, ethmoid and sphenoid, and is not meant to be commonly performed for disease limited to the ethmoid or sphenoid, or for mild or ordinary acute conditions. Cases *may* occur where the maxillary route can be justifiably used for rapidly and safely opening the sphenoid, e. g., a sphenoid causing grave constitutional disturbance might be inaccessible through the nose on account of some nasal deformity of sufficient magnitude to prevent an intranasal operation; in a case of this sort the writer would certainly perforate a healthy antrum to reach the disease.

The following points are to be emphasized: The bony naso-antral wall should be completely removed. The opening into the sphenoid sinus should result in the destruction of practically all of the anterior wall, and at times even of part of its floor. The curettement of the ethmoid cells should result in their complete ablation, and this point should be particularly noted, even though the *lamina popyrocea* is thin or the *cribriform plate* is near at hand. The presence of these structures teaches us that any operation in their proximity must be so complete as to insure that the region may subsequently be kept surgically clean, and these conditions are secured only by the total ablation of the structure involved.

The surgery of the ethmoid labyrinth is to be compared with that of the mastoid cells. Who, in these days of modern technique, would hesitate to remove the zygomatic cells because, forsooth, the dura might be exposed; who would hesitate to clean out all of the matsoid cells down to the very inner table, because the lateral sinus might be endangered? These questions of the surgery of the ethmoid labyrinth are those of technique, but a technique that must be governed always by

accurate anatomic knowledge and that judgment that comes only by experience.

The writer has performed the operation, as described above, twenty times. Fourteen of the cases were reported to this Society at its last Annual Meeting (loc. cit.). Since then the operation has been performed on six other cases of multiple sinusitis.

Of the cases reported last year two are dead—one from tuberculosis as previously reported, and one from exhaustion consequent to a malignant disease (epithelioma) of the accessory sinuses. Of the remaining twelve cases, seven are entirely well. In these seven cases, pus—the thick, creamy variety from which they had suffered before the operations—did not appear during the attacks of coryza or grippe to which they have been subjected, although the secretions were decidedly mucopurulent in character on both sides during the attacks.

There has been a complete lack of crust formation in these seven cases. The patients have not experienced discomfort and are enthusiastic as to their condition. Of the five remaining cases of those reported last year, one has had an accumulation of pus in the sphenoid sinus. This pus manifested itself in the form of large crusts distributed throughout the nose; removal of these revealed fluid pus exuding from a narrow slit scarcely large enough to admit a probe. This slit was all that remained of the large sphenoid opening made at the time of operation. A second case of almost complete closure of the sphenoid was noted, and was accompanied by a third return of "*tic douloureux*," from which the patient had been relieved twice before by operation on the sphenoid. The pus in this case also formed large crusts. The "tic" disappeared on the free opening and after-treatment of the sphenoid sinus. In both of these cases, the pus and crusts did not reform after freely opening and curetting the sphenoid. In the two other cases, persistent, troublesome crust-formations were noted, which were finally traced, in each case, to empyema of the frontal sinus. Operation by a combination of the Kuhnt and Luc methods on the frontal sinuses resulted in a complete cessation of crust-formation and the patients now are perfectly well. The fifth case of crust-formation was found to be dependent upon specific disease and responded promptly to treatment. It is but fair to state that in three of these five cases, on account of a slight accumulation of secretion or

small crusts in the nose, an occasional douching must still be resorted to. These three cases, however, had atrophic mucous membranes before the operation. In two other cases and occasional dryness on the septum and a slight crusting on the posterior pharyngeal wall occurs, but is easily prevented by the use of vaseline.

Thus it will be seen that, of the fourteen cases reported last year, the present condition of seven is what may fairly be called normal. Five of the fourteen cases still have to resort occasionally—and by occasionally I mean every two or three or four days—to a nasal douche or the insertion of vaseline, on account of dryness. Three of the cases, however, had distinctly atrophic mucous membranes with crust-formations before the operation and their condition has been vastly improved by the operative interference.

It will be remembered that in last year's report (loc. cit.) several of the early cases operated upon had to have supplementary curettage of overlooked ethmoid cells to relieve pus and crust-formation. These cases have since done well and are cured.

Of the six cases operated upon since June, 1904, one was a case of right-sided acute pansinusitis of one month's duration. The infection was probably due to grippe. The patient, a man of 30, had been treated conservatively for a month by two able rhinologists, one of whom advised a radical operation on account of constant pain and the symptoms of pyemia. At the operation (December 23, 1904) the antrum, ethmoid and sphenoid were found filled with pus and granulation tissue. The frontal sinus was entered through the ethmoid cells via the antrum and the nose. In this manner free drainage of the frontal sinus was established. It was hoped that this would suffice for the cure of the frontal disease. It did not, however, and four weeks later, on account of elevation of temperature, persistent pain and constant reinfection of the nose from the pus from the frontal sinus, the latter was opened by a combined Kuhnt and Luc operation. The sinus was found to be full of pus and edematous granulation tissue, although free drainage had been established at the first operation, thus showing that drainage alone will not always suffice to effect a cure, even in acute cases of frontal sinusitis. Healing was interrupted by the partial closure by granulation tissue of the nasofrontal opening, which was readily corrected by curetting under

cocain anesthesia, and the case then made an uninterrupted recovery. There has been neither treatment nor discharge for the past three months.

The five other cases—all of chronic multiple sinusitis—had been under the care of many rhinologists. Two of them had atrophic membranes and three had polypoid degeneration. Lack of time prevents further description. They are now well, although two must resort occasionally to the nasal douche and one must use an oil-spray for the dryness in the pharynx.

Where crusts have been found after operation, in the cases cited, they have been traced in each instance to suppuration in a sinus or cell, either frontal, ethmoid or sphenoid. In these cases the writer has failed to find suppuration in the antrum after operation—excepting in one case where the bone from the inferior turbinate was incompletely removed at the operation; its exfoliation was followed by cessation of pus formation. The writer's experience teaches that the more complete the removal of the ethmoid cells, the less likelihood is there of postoperative suppuration or crust-formation. He is confident that the results obtained in these cases could not have been accomplished by intranasal work, for the majority of the cases had been treated for years by many different nasal methods. This route affords advantages that cannot be obtained by the intranasal operation. It is safer because it affords much more room for instrumentation; it permits not only of inspection of the field of operation, but also allows of the digital guidance of the instruments, either through the nose or through the wound; and it renders easy the control of the severe hemorrhage that is so apt to occur from the spheno-maxillary vessels; finally, it permits of a thorough exenteration not only of all diseased structure but also of structures that may be a hindrance both to drainage and to after-treatment.

Injury to the dura, brain or other important structures, is an ever-present possibility in all extensive operations on the ethmoid cells and sphenoid sinus; indeed, it is not unlikely that disease itself reaches to and affects these structures in some cases. These dangers of themselves are sufficient warrant for the selection of a route that will assure the greatest accessibility, the cleanest, smoothest wounds, the best drainage and the greatest facility for after-treatment.

The twenty cases operated on show the following results:

Eleven cases have been cured: Seven for two years, two for one year, one for six months, one for four months. Three of these were cases of unilateral pansinusitis.

Five cases with atrophic mucous membranes before operation still have to resort to occasional douching. They are much improved. Two of these cases are specific and the crust-formations are controlled by constitutional treatment; and one has frontal sinus disease, accounting for the persistent crusting and pus formation. Even this case is vastly improved.

Four cases of *"tic douloureux"* have been cured.

Nine have had grippe and four coryza without harm resulting.

Fifteen have had marked interference with the sense of smell on the affected side.

One has had stricture of the tear duct, cured by probing through the canaliculus.

Two have disappeared from observation, but were in good condition when last heard from.

XXVIII.

THE EXTERNAL OPERATION FOR THE RELIEF OF ETHMOIDITIS.*

By Lewis A. Coffin, M. D.

NEW YORK.

The ethmoids may be independently diseased, or they may be associated in their disease with any or all of the other accessory sinuses of the same side of the head. Both sides of the head may be simultaneously diseased, but I would hardly think of the two sides as associatedly or dependently diseased. Therefore what is said in the following paper refers to one side of the head.

Just what operation should be done upon the ethmoids will depend not only upon whether the disease is restricted to the ethmoids or is associated with disease of other sinuses, but upon the extent and location of the ethmoid involvement, as well as upon what other sinus or sinuses are involved. The condition of the turbinated bodies also should be taken into account in deciding upon the method of operation. Two general principles should guide us:

First: All diseased parts or cells must be reached and treated.

Second: No healthy part should be sacrificed if it can be saved.

If these principles be sound, then it seems to me that, granting that both the intranasal method of operating on the ethmoids and the method of attack through the antrum have their proper place, the method of cleaning out the ethmoid labyrinth or tract through an external opening through the nasal process of the superior maxillary or through the os planum must be in a vast majority of cases the operation of choice. In those cases where the most anterior cells are diseased or where the ethmoidal cells extend over the orbit, it should be the rule, and in children previous to the descent of the second teeth, it is the operation of necessity.

By this method every cell and the sphenoidal sinus can be easily reached and at every point the field of operation is

*Read before the American Laryngological, Rhinological and Otological Society, Boston, 1905.

directly under the eye of the operator. This can be said of no other operation. As frequently happens, the turbinated bones, both the middle and the inferior, are not diseased. By operating by the external method neither of these structures need be sacrificed. This cannot be said of any other operation. If, as we sometimes see, all the structures of the nose, together with its accessory cavities be extensively diseased, it makes but little difference what the operation is so long as we operate thoroughly and to this end it may be necessary to resort to a combination of all the known methods of operation. In a pan-sinusitis, or in any case of ethmoiditis, where it seems necessary to open the frontal sinus, the operation of the ethmoidal region through external opening is the logical complement of the frontal operation. If the antrum be simultaneously diseased, it may be operated at the same time that the fronto-ethmoidal operation is done, or it can be left in the hope that the cavities above it, having been cleaned out, it will take care of itself. At the most, a simple Luc-Caldwell operation allowing of currettage, treatment and good subsequent drainage, is all that is required, and it seems to the writer that the person operated upon comes more nearly to having what can (be called) a nostril than when all the accessory cavities have been turned into one large irregular hole. My preference for the external operation over the intranasal operation is for the following reasons:

First: By the intranasal operation the middle turbinate must be sacrificed.

Second: The intranasal operation is long drawn out and painful.

Third: There are certain parts of the ethmoidal tract that cannot be reached by intranasal method.

The Operation.—In doing the operation one should make a curvilinear incision from above the inner end of the eyebrow across the side of the nose to end about one-third of an inch below the inner canthus of the eye. The incision is carried through the periosteum which should be freed from the bone on both sides of the wound and the flaps or sides held apart by retractors, and an opening into the anterior ethmoids is now made by chisel or trephine through the nasal process of the superior maxillary bone. The ethmoid cells are easily broken down by either curette or forceps. Personally I prefer the curette. Injury to the tear sac or duct or to the cribri-

form are unfortunate accidents, and one should be watchful that they do not occur. In a recent case operated by me injury was done to the everted tear sac by a sharp retractor. To avoid injury to the cribriform during all the earlier part of the curettement, the back of the curette should be kept toward that bone, and all force should be directed downward and toward the median line. When the cells have been pretty thoroughly broken down I am in the habit of smoothing and cleaning up the cavity with a ring curette.

If the whole intranasal structure be so thoroughly diseased as to demand the removal of the entire contents of the nasal cavity it should be done, and the external wound immediately closed. Primary union and no deformity is the rule.

If on the other hand, the turbinates are preserved, the operated cavity may be packed and obliterated. An insignificant scar will mark the point where wound was kept open for packing. Several cases so treated have given most satisfactory results. In the last case which I did, I closed the external wound and packed the operated ethmoidal cavity through an opening in the region of the bulla ethmoidalis. The entire ethmoidal labyrinth was obliterated, the middle turbinate was preserved, and I think from an intranasal standpoint it was the most satisfactory operation in this region that I have done. This was the case in which the tear sac was injured so that it became necessary to remove it. There is a considerable flowing of tears over the lower lid which keeps the cicatrix over the side of the sac in a more or less reddened condition; otherwise the cosmetic results are perfect. We expect to remove the tear gland and thus prevent the tearing.

In closing, I wish to state that I should not, except in children, operate by this method unless the anterior cells were involved.

XXIX.

FURTHER EXPERIENCE WITH RADICAL OPERATIONS FOR FRONTAL SINUS DISEASE.*

By Wolff Freudenthal, M. D.,

NEW YORK.

Since my last report on the radical operation for empyema of the frontal sinus was read, just a year ago, I have had occasion to operate on four additional cases, the results of which I have the honor of presenting to you today. This number of frontal sinus affections may appear large as occurring in the practice of one man within a period of twelve months, but when you learn that one of the cases operated upon cold applications. But would it be wise now-a-days to conperityphlitis—all of which recovered under the use of hot or was an old one in which a relapse had taken place, and that in another I was called in by a general surgeon, the number of new cases becomes reduced to two. I have had some peculiar experiences in these operations, which it seems to me are of importance to anybody engaged in work along these lines. During the last year I have performed Killian's typical operation in two cases and a modified Killian in two.

As to the indications for a radical operation, there are still strong differences of opinion. Extremists are found on either side. Although aware of the fact that some colleagues operate far too often, we are not justified in saying, as some do, that in former years when radical operations were unknown we treated frontal sinus disease without fatal results and that this should be a warning to us now. By analogy we could say: Formerly we did not operate for appendicitis, and yet, to judge from the experience of some physicians, nobody died of that disease. I myself, while house surgeon at the military barracks at Freiburg in Germany, saw a good many cases of tradict an experienced surgeon, if he should propose appendectomy? Undoubtedly normal appendices have been removed unnecessarily, and such mistakes will happen in operating on the frontal sinus as well. The main question for us to

*Read before the American Laryngological, Rhinological and Otological Society, Boston, 1905.

decide is, can we by operation, save a given case which otherwise would be doomed? The answer to this is "yes," simply because we are now able to make a diagnosis of frontal sinus affections more readily than we could ten years ago. I am convinced that many a patient was left to die with the diagnosis of cerebral abscess or the like, which now-a-days could be saved by operation.

But there is another point which is of importance here. Suppose we have a case of empyema of the frontal sinus, in which drainage into the nose can be established only imperfectly. Have we any knowledge of the time it takes for the pus to corrode the bone and perforate into the dura? There is surely a possibility of meningeal infection in postponing surgical intervention. I must quite agree with Beaman Douglass that in these cases a pachymeningitis may set in at any time and cerebral lesion follow as a result of nasal suppuration, for we cannot "claim that, with the free lymphatic and vascular anastomoses which exist between the nose and the brain, this part would escape involvement from a simple extension of the inflammation." Surely the case reported by Panas should be a warning. His patient died of meningitis, and examination of the pus showed that the sinus suppuration was due to staphylococcus aureus, while that of the meninges was due to streptococcus—a secondary infection. The perforation was in the floor of the orbit through the lesser wing of the sphenoid (See Stucky, *Lancet-Clinic*, December 17, 1904).

Nor, in this connection, should the fatal results reported by Dreyfuss and others be ignored. Severe "brain" symptoms are, I believe, not unusual in these chronic cases of frontal sinusitis. Let me remind you of case 4 reported by me (*Jour. Am. Med. Ass'n.*, February 11, 1905). That patient often felt like jumping out of the window, a sensation that has not returned since he was operated on eighteen months ago.

Another case, that terminated fatally, is the following: Mr. S. S., fifty years of age, was suffering from nasal polypi and frontal sinusitis. The polypi were removed in New York by me, and in Paris, London, Vienna, etc. A radical operation was not proposed by anybody. One day, while out west, he awoke with much headache which grew worse steadily for six days, when he suddenly committed suicide. From the time his headache became intense, the nasal discharge ceased and there was undoubtedly a retention of pus that was the cause

of the mental aberration. Although unable to bring forward any direct proof of the truth of my statement, I am convinced nevertheless that it is so.

A third case is that of I. P., 25 years of age. Since the age of four years, he had had nasal trouble, evidenced chiefly by profuse discharge, foul odor, pain and headache. This was neglected until his fourteenth year. Then he was treated with cleansing lotions, etc., without any improvement. Two years ago the radical operation was performed by a well known London colleague, but the patient derived no relief from it whatever. He is a conductor on the "L" Road and told me he asked some of his fellows to keep an eye on him. as he is afraid something will happen to him. He has now double frontal sinusitis with imperfect drainage, but dreads another operation.

All these cases give us a warning to be on our guard constantly. On the other hand, I am convinced that there are thousands of people going about with chronic empyema of one or more of the accessory sinuses, where we would not think of resorting to a radical operation. No doubt every one of you has such cases under treatment. Thus, for example, the brother of Mr. C. M. (Case No. 4) has been treated by me on and off for the last four years for nasal polypi. He comes to see me whenever he is unable to breathe any longer through one or both sides of the nose. At such times, as a rule, his headache becomes so severe that he can hardly attend to his business. He has unqestionably a chronic empyema of both frontal sinuses. After a large part of the polypi are removed and his symptoms leave him he stays away, feeling comfortable, as free drainage becomes established. During the summer months he takes his ocean baths and does not know that he has nasal trouble. I have never thought of proposing a radical operation to him, and he may go on in this way for many years to come and perhaps may never require any radical intervention. These radical operations are always dangerous, since a great many serious and even fatal accidents have happened. In this country, as far as I am aware, very few fatalities have been recorded, while abroad, so skillful a man as Luc, reports five out of his first thirty operations. While cases in which there is nothing left for us to do but to perform a radical operation. This was done with excellent results in *Case I.*

Mrs. A. S., 68 years of age, has complained for the last fifteen months of diplopia. She has also had "for years a very bad catarrh." During the last year she was treated for it by a colleague and the "catarrh improved," although she admits that she has to syringe her nose three or four times a day in order to feel comfortable. Her visual disturbance, however, did not subside. When I saw her, in consultation, she was suffering from extensive proptosis of the left eye, which was pushed forward and towards the temporal region. The anterior and part of the posterior portion of the middle turbinated body had been removed and pus was coming from the infundibular region, the origin of which was found to be in the frontal sinus. This lady absolutely persisted in having an operation performed, as she was afraid of losing her eyesight. Besides, she was very anxious that her eye should regain its former appearance. At the beginning of June, 1904, a Killian operation was performed. The frontal sinus extended only a little above the eyebrow and was filled with granulation tissue and pus. After chiseling away the frontal process all the ethmoidal cells were easily removed, as they presented hardly more than a mass of broken down tissue. The sphenoidal sinus was also cleared out and the external wound closed completely. In spite of her advanced age, this patient made an ideal recovery. Within ten days she was out of the hospital, the discharge from the nose persisting in a mild degree for about six weeks more. Now she feels perfectly well, has no nasal discharge, the proptosis has also disappeared, and there is only a slight scar to be seen on the side of the nose—altogether, as I said, an ideal case.

The narration of the second case I shall omit, as it offered no special features of interest.

In regard to the third case, a man of 31 years of age, whose frontal sinus did not reach above the eyebrow, I would mention only that on scraping away necrotic tissue, I exposed the dura. I do not consider such an occurrence of much importance as long as you do your work aseptically. The man's highest temperature after the operation was 100 F. He left the hospital on the ninth day after the operation.

Hitz, of Milwaukee, reports a case in which he exposed the dura in two places and the patient got well (*Laryngoscope*, April, 1905).

Quite in contrast to these cases is *Case IV*, which I will now

report, and which I believe will interest every one here at this meeting. It has been described in part of my previous paper as Case III, and I will briefly repeat the history here.

Mr. C. M., aged 40, a wholesale merchant, consulted me over two years ago, with quite acute symptoms. He told me he had been unable to breathe well through his nose for the last three or four years. Whether there was pus present during all that time he did not know. Three months ago nasal polypi had been removed in several sittings by a colleague. After the last seance he had "dreadful" headaches. But later it seemed as if something had broken, and an abscess opened, and he then felt easier. About ten days ago this pain returned. It was so severe that he could not sleep at all. For the last two days he felt, on the contrary, like sleeping all the time, although the pain had not left him. He was somewhat dizzy, so that his wife had to lead him into my office, his mind did not seem to be perfectly clear, and he answered questions put to him rather slowly and hesitatingly. Temperature, 101 F. No appetite.

Examination.—On examination I found the parts over the right frontal sinus swollen, and the right eye somewhat closed. Great tenderness to touch at supraorbital margin. Transillumination showed shadow on the right side. In the nose there were several polypi and a mass of pus. Considering the seriousness of the symptoms, I advised an immediate radical operation, but the patient preferred to wait. This gave me an opportunity to remove the polypi. He was growing weaker, felt like vomiting, etc., when, after eight days, his family consented to an operation.

Radical operation after Kuhnt. Eyebrows shaved, horizontal and vertical incision. Periosteum drawn upward and downward; sinus opened above the eyebrow. The cavity, which was filled with pus and granulation, was not very large. The entire anterior wall was affected, and consequently removed, and the rest of the cavity thoroughly scraped out. Drainage into the nose; Myles' tube inserted and sinus packed with gauze. Patient made an uneventful recovery.

So much for the old history. Nine months later he returned to me with mild symptoms of headache, obstruction in the nose, etc. After curetting some of the ethmoidal cells and washing out the frontal sinus he felt well within two days and did not return until six months later. The same symptoms, the same treatment, and the same good result.

On April 12, 1905, I saw him again, his symptoms being much aggravated. The whole right side of the head was painful, especially the right supraorbital region, which was swollen and very tender to the touch. Temperature 100.5; some dizziness. We tried everything to relieve him, but did not succeed this time, and it was evident with the symptoms growing worse quickly, that another radical operation would have to be performed. Apparently Kuhnt's operation had not been thorough enough in this case, and the family hesitated to have him subjected to another more radical one. Still from intranasal methods no relief could be obtained. His headache became very intense, sometimes he felt like vomiting and it was apparent to everyone that his life would be lost unless the sinus was opened from the outside. This was done on April 17, 1905, at 7:30 a. m., and a typical Killian operation was performed. On opening the sinus we found it to be quite large, extending to the external margin of the eye. Undoubtedly at the last operation after Kuhnt when we found the sinus to be small, a pocket which was partitioned off from the rest of the sinus was not seen and been overlooked. This partition had now broken down so that the whole large sinus was exposed to view. This was easily explored in all directions and freed from the large mass of broken down tissue, etc., that filled every crevice. Then the other steps of the operation were performed exactly according to Killian. Before closing the wound we probed the sphenoidal sinus. This was done by myself as well as by my assistant, and the sinus found intact. There was no reason, therefore, to enter it. Furthermore, it must be mentioned that there was no communication between the frontal sinuses, nor was any communication discovered further down on the septum. The operation had lasted more than two hours. The pulse was bad from the beginning and throughout the operation. After the patient was put to bed he had a collapse, which subsided after injections of strychnin, camphor oil and saline solution, with whiskey per rectum. In the afternoon, he vomited once about one ounce of a dark fluid, but on the whole passed a comfortable day. During the night he was somewhat restless and slept at intervals. When I saw him the next morning (temperature 101), he told me he could not see with his left eye, i. e., on the side that was not operated upon. I changed the dressing immediately, and not only found the wound healthy, but the patient now said he could see. Consequently

the wound was dressed again as before. Still, when he once more told me the following day that he could not see with his left eye, things began to look more serious. Again the wound was dressed and all accessory sinuses examined most carefully. Nothing was discovered out of the way. Both sphenoidal sinuses were intact. I went over every step of the operation with my assistants, but we found nothing that we would not repeat in another case. Dr. Henry S. Oppenheimer was called in consultation, and expressed the opinion that a fracture must have occurred somewhere near the foramen opticum in consequence of the chiselling of the bones—a contre coup. The Doctor was surprised that such occurrences did not happen more often. Still, there were other possibilities, and I must confess that I had always hoped that this case would turn out to be one of hysteria, as one of the gentlemen firmly believed. I regret to say that the future development proved Dr. Oppenheimer's diagnosis to be correct. Dr. Charles F. May, who had also seen the patient the day after, practically concurred in Dr. Oppenheimer's views. I gave the patient potassium iodid and ordered absolute rest. On the fourth day after the operation when the wound was dressed, a small stitch-hole abscess was seen at the inner angle of the orbit (temperature 100. F.). This gave us no trouble and on the eleventh day the patient was allowed to go home with a small strip of gauze in situ and adhesive plaster over the small wound. He felt so well that he committed some indiscretion at home, in consequence of which the dressing came off completely during the night. A secondary infection set in, which manifested itself on the third day afterwards in a profuse purulent discharge. It required several weeks of treatment before we mastered the situation, fortunately without the sinuses being affected.

The last report received from Dr. Oppenheimer, June 4th, 1905, says that there is complete atrophy of the optic nerve.

We therefore can have no doubt that there was a fracture about the foramen opticum, causing pressure upon the optic nerve.

In the beginning, when nothing abnormal could be detected in the retina, there were other possibilities open for discussion. The first was hysteria, which was soon excluded, as well as acute retrobulbar neuritis. Another and most important point was the possibility that there had been pus in the right sphenoidal sinus,

which had broken through the septum into the other sphenoidal sinus. I thought of that possibility at once, remembering the very interesting case of sudden blindness reported by T. H. Halsted of Syracuse, N. Y. In this case there was an empyema of the right maxillary, ethmoidal and sphenoidal sinuses, which gave occasion to no ocular symptoms until suddenly blindness developed on the opposite side. This patient was cured by treatment directed to the right sphenoidal sinus. In speaking of the anatomy of this region, Halsted says that the thinnest of all is the plate of bone which separates the sphenoidal sinus from the optic foramen, transmitting the optic nerve and the ophthalmic artery. Considering this thinness of the bone, one must be "struck by the infrequency of reported cases of optic neuritis and blindness resulting from sphenoidal suppuration and abscess, and it must be due to the fact that this sinus and its diseases have been greatly overlooked or underestimated as to their ability to occasion eye diseases." (*Archives of Otology,* 1901, p. 222.) Undoubtedly such cases have occurred, but have been overlooked. In our case, however, there was no such accident, and the only possibility left is a fracture near the optic foramen. Cases are on record in which, as the result of a fall upon the nose or the forehead, such a fracture was caused simply by contre coup, and it is surprising that it has not been noticed before in consequence of chiseling and hammering of these parts. If such accidents should be of frequent occurrence, that would be a strong contra-indication to radical operations of any kind on the frontal sinus. In our case the life of the patient would have been endangered by postponing the operation, and even if we had thought of the possibility of such an accident, we were compelled to risk the loss of one eye rather than that of his life. To avoid such contre coup fracture in the future, it may perhaps be wise to place the head of the patient on a soft and somewhat elastic cushion in order to diminish concussion during the operation.

XXX.

TWO SUCCESSFUL CASES OF OBLITERATION OF THE FONTAL SINUS AFTER REPEATED OPERATIONS.*

By H. Holbrook Curtis, M. D.,

NEW YORK.

The two cases which I present, illustrate the importance of total obliteration of the frontal sinus, as the only sure method of guarding against recurrence of the suppuration from reinfection. The first case was referred by his physician in a western city, to Dr. Charles S. McBurney, and by him sent to me for a radical frontal sinus and antrum operation. The letter giving an interesting history of the case by his own physician reads as follows:

"Dear Doctor:

About five years ago Mr. B. had the grip, at which time he had some swelling and puffiness under the right eye over the right maxillary antrum. There was pain over both antrums. Some time after that both antrums were drilled into after removing the second molar tooth on each side. Pus was found in each antrum. These were douched. Within two months the left one recovered and the discharge stopped; two years later the left antrum was again drilled into and pus found. In the right one the discharge ran along a year and finally stopped. At intervals of from six months to a year the right antrum was again drilled into up to November, 1901, when the present opening was made in the incisive fossa. All this time there was a great deal of pain. The pain was located under the right orbit, over the frontal sinus and at the top of the head. The pain in the top of the head extended to the occipital region. The pain has always been worse in damp weather, and preceding a storm. After a day of unusual mental effort, the pain is increased.

Mr. B. is very suspectible to pain, although he has great powers of resistance. For a number of years, at intervals of perhaps two weeks, he suffered intensely from sick headaches, which were sufficient to put him in bed. For a great many years he has had nightmare; he holloas, and runs about in his

*Read before the American Laryngological, Rhinological and Otological Society, Boston, 1905.

sleep, and, to one who does not know him, it is quite alarming.

Mr. B. came under my care on the 22nd of February, 1902, at which time he had the present opening in the right maxillary antrum, which was excreting from a teaspoonful to two teaspoonfuls of pus in twenty-four hours. The left antrum was also excreting pus in smaller quantity. He was suffering very much from pain under the right orbit, under the left orbit, in the frontal region extending across the brow, and in the top of the head and occipital region. The condition of both antrums had been properly diagnosed. In probing the right antrum, an opening was found at the upper, inner and anterior portion of the antrum, through which a probe passed into what was at first thought to be the anterior ethmoidal cells. Afterwards it was determined that this probe passed into the frontal sinus. An X-Ray examination revealed this fact, as well as the presence of the point of the probe in the frontal sinus when the operation of opening it was made. Trans-illumination never showed the frontal sinuses dark. The character and location of the pain led me to believe that more than the antrum was involved. To confirm this the anterior half of the middle turbinate was removed April 8, 1902. The anterior ethmoidal cells were found to be diseased, and pus came from them after the removal of the middle turbinate. No pus was found in the nose at any time prior to this, to help locate the disease. The anterior ethmoidal cells were curetted and an unsuccessful effort made at this time to wash out the frontal sinus through the nose. September 22, 1902, the frontal sinus was opened at the point indicated by the present wound. The opening made into the bone was about three-eighths of an inch in diameter. The frontal sinus was found to be filled with granulation tissue which was very dark and bled easily. An effort was made to curette the whole frontal sinus on the right side. The opening into the nose from the frontal sinus was made free and large so that there was free access between the sinus and nose. We irrigated the frontal sinus and the antrum at intervals of from 24 to 72 hours, using sterile water, or sterile water containing boric acid, or Borolyptol, or Formaseptol, or equal parts of bi-carbonate of soda, bi-borate of soda, and chlorate of soda. The odor of the discharge at first was quite offensive. Recently the discharge has almost subsided, and there has been very little or no odor. By reason of the continuance of the pain the posterior

half of the middle turbinate was removed from the right nostril about February 1, 1903, and some of the posterior ethmoidal cells were broken down and more of the floor of the anterior ethmoidal cells was cut away. Pus was found in the posterior ethmoidal cells. The sphenoidal cell has been probed a number of times and the ethmoidal cells were cut away. Pus was found in the posterior pharynx at intervals extending over the observation of this case, without at any time finding evidence of involvement of the sphenoidal sinus.

The left antrum was irrigated through a puncture in the nose and has not discharged any for the past six months, although the pain over the left antrum has been as severe at times since then as at any time when it contained pus.

Not more than five or six drops of pus have been washed out of the frontal sinus and right antrum at any recent washing. In spite of this fact the pain has not diminished at all. If there is any difference in the degree of pain, it seems that it has been worse for the past five weeks. Recently the frontal sinus has been irrigated through the nose.

As a boy Mr. B. had a periodic internal strabismus in which the left eye was the offender. He has an esophoria and a compound hypermetropic astigmatism in each eye. Repeated ophthalmoscopic examinations have shown normal fundi.

Recently there has been considerable pain in each ear which has seemed to be in excess of that which would be expected from the local disturbance in the ears themselves.

The question now confronting us is: What is still producing the pain? Is it due to pus still retained in some cell or cells that have not been opened? Is it due to the inflammation that is still present, though not sufficient to cause pus? Or, is it due to the presence of the plugs which evidently produce more or less iritation to the branches of the fifth nerve?

Yours truly, J. L. M."

When the patient came to me he was wearing a gutta percha obturator in his right canine fossa perforation and a similar contrivance through the interior wall of his right frontal sinus, to keep the wounds open for the purpose of douching. The latter plug he had worn for several months. His right antrum was discharging pus as was also his frontal sinus; the left antrum was causing much pain, but the discharge was not appreciable in the middle meatus. Most agonizing and con-

stant pain was a marked characteristic of this case throughout. The right eyelid was indurated and inflammed from the obturator. There seemed every indication for a Killian operation upon the right sinus, but the condition of his eyelid and the inferior wall was such that I did not see my way clear to making a flap which would be satisfactory. I determined, however, to attempt to save the superciliary ridge to prevent deformity and though the bone was very necrosed below the ridge I elected to enter the anterior wall. The patient was anaesthetized by Dr. Denton and I operated as follows. The incision was from the root of the nose on a line above the eyebrow rather higher than usual as you see by the photograph,

Fig 1.

Fig. 2.

having ascertained previously that the sinus was a very large one and extended three-quarters or an inch above the ridge. The sinus walls were found luxuriant in granulation tissue of most unhealthy type, with necrosis of the anterior wall and almost complete destruction of the inferior plate. I cleansed the sinus and curetted the anterior wall in the supraorbital portion, which I preserved as a thin bridge. I then dissected out the old wound in the inferior tissues beneath the ridge and removed the entire inferior wall. The next step was the breaking down of the posterior ethmoid cells which were badly diseased, clearing out the anterior cells as well. Having done this work most thoroughly, I decided to attempt to obliterate the sinus by packing. The condition of the soft tissues in the

orbital region was such that it was impossible to attempt to close the old wound so I left both incisions open and after careful washings with peroxid packed the entire cavity with iodoform gauze. After a week I succeeded in closing the inferior wound and obtained a primary healing. For eight weeks I carefully packed the sinus with iodoform wool which I have previously described, using this after the first dressing of gauze. This I consider the very best dressing for exciting granulations Little by little the granulations approached and tended to close the nasal orifice; the moment this was accomplished the sinus filled up with great rapidity and the frontal wound was closed after slight paring of its edges at the tenth week. The point I wish to make is this: Obliteration of the sinus is the objective point to be attained in frontal sinus work, and if patience and discretion are used in packing, this object may be accomplished even in very large cavities with extensive ethmoidal complications. I will not detail the operations on the antra and the sphenoid sinus in this case, which were performed after the dread of reinfection was removed by obliteration of the frontal sinus. Suffice it is to say that an individual to whom life had become unendurable, has been relieved of his suffering and able to comfortably carry on the arduous duties of secretary of an important financial institution in the west. I will say that the photograph is taken to show the cicatrix and that the scar on the individual is not as prominent as it appears to be in the picture.

Case II.—I wish to cite a case which like the last, has been through many hands, but continued failures always took place from the fact that the sinus as well as the antrum, became constantly reinfected. A description of the case by a colleague in Philadelphia, may be of interest:

"Mrs. K. has had empyema of the right frontal sinus and of the right antrum of Highmore for one year at least, though there is a history of neuralgia dating back three years.

In December, 1895, shortly after she first consulted me, I removed one-half drachm of thick muco-pus from the right maxillary sinus. While the antrum steadily improved under the frequent irrigation through the ostium maxillare, the frontal inflammation got steadily worse.

Numerous small polypi were removed from about the naso-frontal duct, but at no time was any pus seen there.

Transillumination of antrum positive, of frontal negative.

Frequent attacks of inflammation of the frontal sinus, causing marked edema over the cavity, occurred with extreme pain at the time but lasting only a day or two very severely. These attacks becoming worse and more frequent, the frontal sinus and antrum were opened under ether. The frontal cavity was filled with small polypi or granulations and some thick pus, the antrum contained thick muco-pus. The floor of the frontal sinus was broken through into the nose and a rubber drainage tube passed through and out at the nostril. Both antrum and frontal were packed with iodoform gauze, the former daily for over four weeks.

The drainage tube was removed on tenth day and a horsehair drain substituted for a couple of days longer.

At the time of operation, I endeavored to pass a filiform bogie through the nasofrontal duct, but it was either markedly stenosed or entirely obliterated.

With a curved delicate probe one can now enter the cavity through the new opening which is beneath the extreme anterior end of the middle turbinates.

When the flow from these cavities was obstructed, before the operation, Mrs. K. had very severe neuralgia of the right side of the neck and in the right ear. There was seldom complaint of pain over the antrum, and over the frontal except during the attacks, which were several times a week at first but later once a month. When less frequent, the pain was severer.

The tooth is not the cause of the difficulty. It has been repeatedly examined by skilled dentists, a mirror even being used inside the cavity to view it."

This letter was written in 1895 and the patient continued the victim of pain and discharge until 1903 when in December of that year she was referred to me by Dr. Kinnicutt. I operated on the frontal sinus by entering and removing the anterior wall above the orbital ridge, except at the nasal portion where I was obliged to remove part of the ridge itself to obtain better access to the posterior cells.

As this case had been previously twice operated upon through the inferior wall, I was obliged to remove a greater portion of this wall during the operation but preserved the intergrity of the soft tissues.

Here as in the previous case I made a very free opening into the nose and packed for some weeks with iodoform wool

until the sinus was obliterated. I then did a slight plastic operation to remove the edges of the cicatrix. The photograph shows the scar to be scarcely visible.

In three weeks I operated on the antrum through the canine fossa, making a very free opening through the inferior meatus for packing. The wearing of obturators through the alveolar puncture which had gone on for years in this case made it necessary to remove much of the floor of the antrum, but I succeeded finally in closing a large buccal orifice and carried out my treatment through the nose until an absolute cure was effected. The patient wrote me a month since that for eighteen months she has had no pain and no discharge from sinus or antrum. The questions of interest which have suggested themselves to me as the result of these and like cases, are these:

1st. Is it ever expedient to attempt to incorporate the anterior sinus wall in a skin flap, after removal of the inferior wall, for the purpose of obliteration?

2nd. Provided thorough asepsis is carried out, the obliteration of the sinus becomes so possible: how often are we ever justified in closing our superficial wound until we are sure that we have secured this end?

3rd. Even with a Killian bone incision. May we not get better results by packing from above and keeping our flesh wound open until we are satisfied with the appearance of the nasal cavity as viewed from above?

4th. In operating on the frontal sinus should not the integrity of the inferior wall be preserved if possible, for two reasons?

1st. The pulley of the superior oblique muscle should not be interfered with, and 2nd, the nevous return through the angular and ophthalmic veins into the cavernous sinus should not be unnecessarily exposed to infection.

It has been my observation that cases of fatal termination have been those in which the inferior wall near the nasal junction has been attached and the infection carried to the cerebral sinuses through the above mentioned channels.

These and similar questions have been discussed from many standpoints, I would simply say that in my hands obliteration of the sinus by packing has more than proved the success I predicted for the method, which I advocated in my paper read before the Society in 1902.

XXXI.

REPORT OF A CASE OF INFLAMED DENTIGEROUS CYST SIMULATING ABSCESS OF THE ANTRUM OF HIGHMORE, CAUSED BY AN ODONTOMA.*

By William H. Haskin, M. D.,

NEW YORK.

The case to be reported is of interest from several points of view and is rather unusual. The history is of a man, W. H. W., 33 years of age, who, as is shown by his letter, suffered with neuralgia as far back as 1893, and so severely that he had all his teeth extracted on the upper jaw, although only four of the front teeth were decayed. The cure of the neuralgia was apparently effectual, and with a full upper indenture he was comparatively comfortable for years, but there developed another condition which was due entirely to his original disease and was probably the cause of the neuralgia.

I give his letter to me in full:

"The following is an account of conditions relative to pres ent trouble, existing from the time I had my upper teeth extracted in 1893. As far as I remember, I had four (but possibly five) badly decayed teeth in the front of the upper jaw, the others being in good condition. I had suffered for years with intense neuralgia, always on the right side of my face. I could get no relief from medicines and finally consented to the extraction of all my upper teeth.

From that time till July, 1903, I had no trouble and wore a full upper indenture with perfcet comfort. Then a small hard lump appeared about the place of the present trouble, which was very painful and interfered with mastication. The dentist relieved the pain by adjusting the indenture, and I had no further trouble until September, 1904, though the swelling became considerably larger during that time.

September 1st an abscess developed at the seat of the swelling, which broke at the end of eight days and refilled three days later, breaking a second time at the end of seven days. I then consulted first a doctor and then a dentist, both of whom said that there was decayed bone present, and on the advice of the dentist I write to ask when I may call at your office.

W. H. W."

*Read before the American Laryngological, Rhinological and Otological Society, Boston, 1905.

September 29th, 1904, he came to my office. Close questioning elicited no symptoms of antrum disease and there was no condition in the nose indicating its involvement. Externally, the right cheek was immensely swollen, with edema of both eyelids. The wall was very hard in the middle but pitted badly around the circumference. Within the mouth the alveolar border presented a normal atrophied appearance, without any fistula or indication of caries. The swelling on the right extended from just above the free alveolar margin below to the malar ridge above, and from the ramus of the inferior maxilla posteriorly to the ala of the nose anteriorly. It presented a smooth rounded surface which seemed to be too hard for a simple inflammatory exudate. Three-quarters of an inch from the free border, at a point opposite the lower bicuspid, was a fistulous opening which discharged pus. A probe entered a large cavity of irregular outline and at several points detected exposed bone.

On September 30th, at the Manhattan Eye and Ear Hospital, under ether anaesthesia, a long incision was made along the alveolus and the periosteum was elevated until the fistulous opening was exposed in the bony wall of the swelling. This wall was very thin and would, I judged, have held a large English walnut very readily. The outer wall was easily removed with rongeur forceps and curettes, although it extended so closely to the malar bone that I felt I was curetting that bone. The inner wall, corresponding to the anterior surface of the inferior maxilla, was covered with granulations, but I could find no opening into the antrum and avoided puncturing it. There was a large amount of granulation tissue in every direction and on both sides of the cyst wall, which was removed with considerable difficulty in places. At the time of the operation I did not detect any unusual condition on the alveolus, though it was carefully scraped to remove any caries. The cavity was then packed tightly with iodoform gauze.

The patient was discharged from the hospital October 4, 1904, and continued treatment at my office.

October 7th, 1904, an abscess developed in the outer wall which threatened to rupture through the cheek, but fortunately did not, as I was able to drain it from within the cavity. There were no unusual symptoms, but on October 18th, in order to cut down exuberant granulations to aid in the re-

moval of a supposed sequestrum at the incision, I used a 50% solution of silver nitrate. On his next visit the probe detected this exposed spot in the alveolus which on examination appeared black, and which on removal proved to be an overlooked root, with a large odontoma involving it.

After this the whole cavity closed rapidly, though several times I packed it with enzymol to remove small areas of exposed bone tissue. I saw him once a week in November, and last on December 12th, 1904, on which date there was no trace of any trouble and he was able to use his upper indenture with perfect comfort.

On examination, the root which was removed presented a large odontoma but no evidence of any caries on its exterior, the upper surface being as though recently broken and the root canal being still patent..

This case presents the interesting phase of the attempt to cure facial neuragia by the extraction of all the upper teeth—although there were not more than four or five decayed ones present—and its apparent success, for there was no return of neuralgia for at least ten years.

The question, however, arises, and most pertinently, whether the removal of the above root alone would not have been sufficient of itself, and emphasizes how careless a dentist can become when he will allow such roots to remain at the time of extraction.

The history I obtained from the patient on close questioning led me to suspect that possibly there had developed a dentigerous cyst in the anterior wall of the superior maxilla He said that for some months he had noticed a fullness on that side of his face which interfered with the fit of his upper indenture, which he has had cut out on two occasions. I believe that the above was the case, but that some inflammation or injury had caused inflammation to return, and the wall gave way, allowing the escape of its contents. He could not tell me the nature of the discharge, so I could not be certain, but the fact that there was a large cavity surrounded by a very thin osseous wall, that there had been no pain with the swelling until just before the wall ruptured on September 1st, 1904, would tend to the diagnosis of a cyst of some sort. If such was the case, it undoubtedly sprang from the alveolar socket that held the odontoma which I have presented to you.

I could present a number of other cases of interest, which have all been caused by the presence of tooth roots, and I believe that in all cases where we send patients to have teeth extracted we should advise them to bring the teeth back to be certain that no roots have been left, and in that way insure ourselves of no further trouble. It surely would be wiser to pursue this course, even though it should cause some necrosis of the alveolus, for that invariably heals promptly and I have never known serious trouble to result.

Dr. Cobb, in 1900, reported several cases of dentigerous cysts in this location, and was surprised at the rapid absorption of the cyst after the contents had been allowed to escape. In this case, owing to the inflamed condition of the whole tissue, I thought it best to remove as much of the wall as possible; and I believe that this should be the procedure followed in all cases, for my experience has always been that if the cyst wall in any case remains, there is always a strong possibility that it will refill in time.

I have carefully examined the Index Medicus for the past three years, but have been unable to find any reports of cases resembling those Dr. Cobb presented and this which I have just reported.

XXXII.

NEW OPERATION AND INSTRUMENTS FOR DRAINING THE FRONTAL SINUS.*

By E. Fletcher Ingals, M. D.,

CHICAGO.

Acute suppurative inflammation of the frontal sinus generally heals without oepration on the sinus provided obstructions to the escape of the pus from the lower end of the canalis naso-frontalis are removed and I believe that in the majority of cases chronic suppuration of this cavity would soon cease under simple measures if there were free drainage. At all events free drainage is necessary in every case whether or not curetting of the cavity is required, and the more easily this can be secured, the better. In my experience most patients refuse to have an external operation performed, probably on account of their dread of the resulting scar, and they can be driven to it only by intolerable pain or by external deformity due to the disease.

In nearly all cases, a probe may be passed from the naris into the frontal sinus after the anterior portion of the middle turbinated body and any pathologic obstructions have been removed. Whatever operation is to be performed all these obstructing conditions should first be eliminated, therefore, very few cases remain in which a simple and safe intranasal operation that will establish free drainage is not eminently desirable.

I desire to present such an operation for your consideration without taking time to refer to any of the other well known operations. In a word my operation consists of passing a steel pilot through the natural canal into the frontal sinus and running in over this a hollow burr by which a canal six mm. in diameter is made, and then inserting into this canal a self retaining gold tube so large that the pus will necessarily drain and that the patient may easily wash out the sinus.

*Read before the American Laryngological, Rhinological and Otological Society, Boston, 1905.

In performing the operation, I first introduce a small silver canula and wash out the frontal sinus with a 50% solution of the commercial solution of peroxide of hydrogen, warm; I immediately follow this with a warm saturated solution of boric acid. I then inject into the sinus slowly, five to ten minims of the following solution which trickles down about the canula and anesthetizes the field of operation: Atropin gr. 1-10th, Strophanthin gr. 1-5th, Suprenalin gr. 1-5th, Oleum Caryophyli M. iii, Acid Carbolic gr. x, Cocain Hydrochlorate gr. xcvi, Aqua. Dist. ad. f. oz. i. I then introduce the steel pilot Fig. I, A, which is no larger than an ordinary probe, and with the patient in the sitting position, administer chlorid of ethyl for about a minute which insures complete anethesia. The handle is removed from the pilot and the hollow burr Fig. I, B, (which has already had a flexible sheath. Fig. I, C, slipped over it and been attached to the chuck of a dental engine) is

Fig. 1. Ingals' Pilot Burr; two-thirds size. A, pilot; B, burr; C, shield.

slipped over this pilot into the naris and up to the lower end of the nasofrontal canal. Gentle continuous pressure is then made, the electric current is turned on and within a few seconds the frontal sinus has been entered. Before turning on the power one should note just how much of the proximal end of the burr protrudes from the nostril, otherwise he will not realize when it has passed into the sinus and he may waste a lot of time (as I did in one operation) in the futile effort to make it go farther. One cannot recognize the drilling of the bone by either sound or the feeling of the instrument. As soon as the sinus has been entered the burr is withdrawn and a packer (similar to a uterine packer), the end of which has been bent to the same curve as the pilot, is introduced and through it the frontal sinus is packed and dried by a strip of of the whole canal, and this strip is then drawn out, through the packer, so as to avoid cauterizing other parts of the nasal cavity.

absorbent gauze an inch in width which is left long enough to stop any bleeding. The gauze is then withdrawn and a similar strip saturated with 95% of carbolic acid or with a 10-20% solution of chlorid of zinc is introduced in the same way and allowed to remain a few minutes. The packer is then withdrawn about an inch to insure thorough cauterization of the whole canal, and this strip is then drawn out, through the

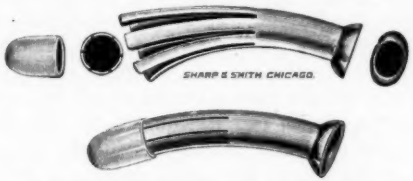

Fig. 2. Ingals' Spring-gold Frontal-sinus Drainage Tube. The upper tube in the cut shows the upper end opened out. The small cut at the right shows the lower end of the tube. The small cuts at the left shows the diameter of the tube and the gelatine capsule. The lower tube shows the tube with the upper end spring into the capsule.

packer, so as to avoid cauterizing other parts of the nasal cavity. The gold tube (Fig. 2), the upper end of which has been sprung together and covered with a gelatine capsule, is then slipped on an applicator and passed up the canal until stopped by its lower flaring end. A probe is now pressed up against the end of the tube and the applicator is withdrawn. For recent operations I have used the shield C, Fig. I, which has been made a spiral

Fig. 3. Syringe for Washing Frontal Sinus; two-thirds size.

tube throughout its whole length, to put over the applicator as a check to prevent the gold tube from slipping too far on it. When the gold tube has been placed in the canal it is crowded off the applicator, as the latter is withdrawn, by pushing the spiral tube upward. Within half a minute the gelatine capsule will dissolve and the end of the tube will have opened out so that it will be retained. The operation is then

complete. I give the patient a small syringe with a bent nozzle, by which the frontal sinus can be washed out or medicated. Little or no attention by the surgeon will be needed afterward. The instruments consist of a flexible steel pilot, Fig. I, A, 14½ cm. long and one to one and one-half mm. in diameter which will project 5 to 10 mm. beyond the hollow burr when the latter has been passed up to the farthest extent. This absolutely prevents perforating the top wall of the sinus. A removable handle for the pilot to facilitate its introduction. A hollow burr, Fig. I, permanently fixed to the end of a hollow steel wire cable, six cm. in length which is permanently fixed to a steel tube (like a trephine) the other end of which terminates in a shank for attachment to the dental engine chuck. At the proximal end of this tubular portion where it terminates in the shank, is a small opening in its side to facilitate cleaning. The cutting burr is six mm. long and six and one-half mm. in diameter and is so made that it will feed rapidly and cut any bone with which it comes in contact. The burr might be made larger without much danger of doing harm, but I believe its present size is within the limits of perfect safety and in the light of experience, I can see no reason for a larger drainage canal than this affords. The whole instrument which I have named, pilot-burr, is 19 cm. in length.

It will be observed that the distal end of the pilot is necessarily kept in position by the canal into which it is inserted so that the whole apparatus can not revolve when the burr is turning, and the proximal end is held by the tubular end of the burr so that the operator has the instrument under control. The thin spiral steel sheath for the cable and tubular portion of the burr, Fig. I, C, prevents any injury to the nasal passages due to rapid turning of the instrument. This is flexible so that it may follow any curve that is given to the pilot. A dental engine, rated one-eighth horsepower furnishes the most convenient power though an apparatus to operate the burr by hand might be made. The packer Fig. IV, is a thin tube the external diameter of which is a trifle less than that of the burr.

It is bent to the same curve as the pilot and is very easily introduced through the enlarged canal into the frontal sinus. From the examination of the frontal sinus in cadavers upon which I did the operation, I found that the opening through the mucous membrane lining the frontal sinus was not clear

cut, and was apparently much smaller than the burr, therefore I had a ring knife made on a flexible steel stem wherewith to curette the borders of the ostium frontale; this worked satisfactorily, but since perfecting the drainage tube, I find it unnecessary. The self-retaining gold tube Fig. II is three and one-half cm. long and six mm. in diameter. It is made of spring gold. The lower end has an oval cup-like flange nine mm. long by six mm. wide. From the upper end the tube is sawed down two cm. in six places, making six sections, nearly a mm. of the end of each of which is bent inward at a right angle so as to make the end blunt. About 12 mm. below this upper end

Fig 4. Frontal Sinus Packer; one-third size.

I bend out each of these sections so as to make the upper end funnel shaped and about nine mm. across at the end, which makes the tube self retaining. The slits down the side make each of these sections a nearly flat spring about two mm. wide and two cm. long and renders it easy to withdraw the tube at any time the surgeon may wish. The slits also prevent pocketing of pus about the tube in the lower part of the sinus. The part of a gelatine capsule used to hold these six spring sections together when introducing the tube is a trifle smaller than the outside of the gold drainage tube. The applicator is a bent copper wire over which I pass the spiral shield thus forming a shoulder to prevent it from slipping too far into the gold tube, and providing a means of pushing the latter off of the applicator. The syringe that I furnish the patient; Fig. III, consists of a small rubber bulb holding two to four drachms fitted with a hard rubber tube three and one-half mm. in diameter and seven to eight cm. long. This was made of

an antitoxin bulb, the vent of which had been closed, and a tube taken from an old atomizer. A Eustachian catheter might be bent for this purpose.

Beamon Douglass in the *Laryngoscope* for May, 1904, p. 346, gave five objections to intra-nasal operations for opening the frontal sinuses.

1st. Absence of the frontal sinus.

2nd. Thinness of the posterior (or upper) wall of the sinus.

3rd. Liability of entering an enlarged ethmoid cell instead of the frontal sinus.

4th. Variation in direction of naso-frontal duct.

5th. Danger of opening into the olfactory fissure and injuring the nasal artery and nerve, and of opening a direct line of communication with the brain, with the possibility of injuring the brain, or of septic meningitis.

The first and fourth of these objections have no bearing on the operation that I propose.

Regarding the second—because of the protrusion of the end of the pilot, it is impossible to perforate the posterior wall of the sinus in this operation, excepting by a lateral grinding action of the burr in an extremely narrow sinus, where the dural surface of this wall would be less than three mm. distant from the center of the naso-frontal duct—a condition that if ever present, would be extremely rare. If such a condition were met with, I do not think the dura could be cut by the burr.

Regarding the third objection. If an ethmoid cell is suppurating, it should be drained, therefore no harm would be done by this operation.

Fifth. As to the danger from the olfactory fissure—the objection urged applies with even greater force to external operations that establish a drainage canal large enough to be permanent. Furthermore, injury of either the artery or nerve would be of no serious moment. The danger of infection must be met in any case and should be minimized in every possible way, but this danger is no greater with this than with other operations.

In conclusion, the advantages presented by this operation in suitable cases as they appear to me are:

1st. It causes no scar, it affords efficient drainage and it enables the patient himself easily to cleanse the sinus.

2nd. It is much safer than other intranasal methods.

3rd. It can be done early before permanent pathologic

changes have taken place and in such cases it may be expected to effect a cure.

4th. The early establishment of free drainage usually prevents serious pathologic changes.

5th. It is no bar to a later external operation if that should become necessary; indeed, it takes the place of a part of that operation as it removes all mucous membrane from the naso-frontal duct, a measure so strongly urged by Coakley, and as it will open any projecting ethmoid cells and establish a free drain, it will render the radical operation much less formidable.

6th. It will cure a large percentage of chronic cases.

I have done the operation several times with good results, two chronic cases, each of about 10 years duration, were cured, and in no case has anything unfavorable occurred; therefore, I can heartily recommend it in practically all cases of suppuration of the frontal sinus in which a probe can be passed from the naris into this cavity. If the disease occurred in a sister, a wife or a daughter few of us would hesitate as to what operation should be first tried."

DISCUSSION ON SYMPOSIUM; DISEASES OF THE ACCESSORY SINUSES.

Dr. H. P. Mosher, of Boston, in connection with this symposium upon diseases of the accessory sinuses, showed two cases of frontal sinus disease that had been operated upon by the Coakley method. In one the operation had been done two weeks ago; in the other four weeks ago. The cases were shown to illustrate the simple nature of the operation, and the appearance of the wound in the course of healing.

Dr. George L. Richards, of Fall River, Mass., showed three cases of double frontal sinus disease, and one of unilateral frontal disease treated by the obliteration method, with excellent results. The openings into the sinuses had been made under the ridge at the internal angle of the eye, and then enlarged, so that all the sinus area could be reached by the curette. He also exhibited a number of anatomic specimens showing abnormal conditions of the accessory sinuses. Owing to the comparative frequency of these peculiar anatomic conformations, Dr. Richards said it could not be expected that one operation would fit all cases. In some of the specimens shown the conditions were such that complete obliteration of all the cells was practically impossible.

A complete cure in a certain number of cases of sinus disease, the speaker said, was scarcely to be expected. When the disease had lasted for years, how was it possible to get out every cell? The majority of these patients were perfectly satisfied if they could get rid of the pain and most of the discharge, with the restoration of good, normal breathing, and without the recurrence of polypi. If so much could be done for them, they would be perfectly willing to report for treatment occasionally.

Many cases of chronic frontal sinus disease, Dr. Richards said, would get well if free drainage could be secured. The statement made by Dr. Coakley some years ago that the long continuance of the discharge prior to operation had no relation to the question of how quickly a cure could be effected was often well illustrated in natural disease.

The question of deformity resulting from operation for frontal sinusitis was not to be disregarded. As a rule, American patients, especially women, preferred the operation he had demonstrated rather than the extremely radical one of Killian, or even that of Coakley.

Dr. Joseph Payson Clark, of Boston, said the subject of sinusitis and its treatment was such a large one, and had been so thoroughly covered in the papers presented, that he would limit himself to one or two points. He appreciated, as much as anyone, the success that had attended the work of Dr. Coakley, and the unusually large experience which he had had in frontal sinus surgery, but the fact should not be lost sight of that in a very large proportion of cases there was a resulting deformity from such radical operations, and that many patients refused to submit to them if they could be relieved from pain in any other way, even with a prospect of the possible continuance of a slight nasal discharge.

When fifty per cent or more of frontal sinus cases had been cured when treated by the so-called Ogston-Luc method, he considered it too radical a step to take to abandon that operation entirely. It seemed to him that efforts to improve its technique would be profitable. He urged that each case be most carefully studied, and the most conservative treatment adopted which seemed applicable to the case in question.

Dr. James E. Logan, of Kansas City, said that this question of diseases of the accessory sinuses was a most important one, and could not be too fully discussed. There were a few points that he wished to emphasize, and one was, that conservatism should be practiced in dealing with cases of frontal sinus involvement. In most instances, the disease was not confined to the frontal sinuses, and we should not be too aggressive in dealing with this condition. The speaker said he agreed with Dr. Richards that the possible resulting deformity from a radical operation should not be overlooked. The important element in the cure was the establishment of free drainage, and this was apparently secured by the intranasal method described by Dr. Ingals. In suitable cases and in their selection the X-Rays would prove of valuable assistance, an intranasal operation should always be considered before advising the more radical external method.

Dr. H. W. Loeb, of St. Louis, said that in view of the exhaustive character of the papers that had been presented, it

was very difficult for any one to do more than generalize on the subject under discussion. It was evident, from what had been said, that each man was able to do his particular operation with a great deal of skill, which showed the value of the personal equation in this as well as in other fields of medicine and surgery. For example, one man was able to get better results by employing a method that he had thoroughly mastered than he would obtain with a perhaps superior method that he did not understand so well. This same factor of the personal skill and proficiency of the operator was of importance in connection with the resulting deformity. Some were strongly in favor of conservative measures, and certainly, if we were able to dispense with the radical operation, and to substitute instead the method suggested by Dr. Ingals, it would be well to advocate it.

The papers composing the symposium on this subject had at least emphasized the fact that these operations could be done, and done well, in various ways by different operators.

Dr. Lee M. Hurd, of New York, said he had done conservative work in fifteen cases of frontal sinus disease, and had secured perfect drainage. He had simply entered the frontal sinus through the nose, enlarging the frontal duct in an anterior direction. The bone was sacrificed with forceps or other instrument. making the openings into the sinus as large as possible, and then injecting the sinus, once weekly, with a from five to twenty per cent. nitrate of silver solution. If the patient tolerated this, a saturated solution of silver nitrate was then used. At the same time, he used salt solution in the nose to counteract the effects of the silver solution there. Of the fifteen cases, he secured an absolute cure in six, and improvement in all of the rest, all the symptoms, excepting a diminished purulent discharge, disappearing.

The speaker said he had also operated upon six cases of antral, ethmoidal and sphenoidal disease. The first one, of over a year's standing, was absolutely well without any crusting whatever; of the remaining five, all were well, but there remained some tendency to crusting. He believed this would disappear in time. One of the cases had frontal sinusitis, and made a prompt recovery in spite of the pus running down over the antral wound..

Dr. Thomas J. Harris, of New York, said the papers making up this symposium deserved the highest commendation; the

members should not fail to recognize how much time and labor had been spent in their preparation, and personally he wished to express his appreciation of their value.

The speaker said he would confine his remarks chiefly to the subject of frontal sinusitis and its conservative treatment, as suggested by Drs. Clark and Logan. We should consider, first of all, the necessity of radical work in this region. Was it necessary, in the majority of cases, to do either a radical intra or extranasal operation? Leaving out of consideration the urgent cases, to which Dr. Coakley had referred in his paper, was it not true that the majority of our patients would be satisfied with what could be done for them by the usual methods that were employed, namely, the removal of the anterior end of the middle turbinate, and the clearing out of other obstructions? In the large majority of cases, this comparatively simple treatment would prove of immense satisfaction to the patient, and if, after this had been done, there was still a certain amount of muco-purulent discharge now and then, would we be justified in sacrificing the anterior frontal wall? The speaker said he did not think so. It should not be forgotten that the radical operation was not unattended with risk to life. Dr. Logan Turner had collected twenty-four fatal results following operations on the frontal sinus. Another factor to be borne in mind was the resulting deformity.

The most important feature in any method of operation on the frontal sinus was to secure free drainage, and as Dr. Loeb had stated, the personal equation was everything. The speaker said that while it would ill become him to criticise or even allude to Dr. Coakley's very extensive work in this field, he still thought there was room for an operation that would give rise to less deformity. He favored Dr. Richards' method, so far as the lack of deformity it entailed was concerned, but it left the question of a complete cure open to doubt, and the same was true of the Ogston-Luc operation. In the cases that he had operated on with Dr. Coffin, the speaker said that recently they had followed the Killian method. He considered the preservation of the ridge as a very essential point in avoiding the deformity that was otherwise so apt to occur.

Dr. H. P. Mosher, of Boston, said that the more he studied the anatomy of the frontal sinuses in the dissecting-room, the more he felt like getting a view into the sinus in the cases which he met clinically. None of the speakers had said anything

about opening the sinus for exploratory purposes. This was very simple, and left no scar. In the future, it ought to become a customary procedure, because the operator at once saw what the condition of the sinus was, and could do little or much for its relief, as the case might require.

The method of reaching the sinus through the nose was the oldest method of all that had been devised for treating the sinus. Men were continually coming back to it, but it was poor anatomy to use this route, and therefore poor surgery. The method described by Dr. Ingals, while it excluded the danger of injuring the posterior wall of the sinus, did not exclude the danger of injury to the posterior internal angle, the dangerous area of the sinus. In that angle the cribriform plate often sent forward a prolongation,and into that region, the bony canal of the foramen caecum, the vein which begins the great superior longitudinal sinus at times extends.

After comparing the scars left by the frontal sinus operation, the speaker thought there was less deformity in the cases that had been shown, where the sinus was entered above the orbital rim.

In conncetion with the method of opening the sinus at the upper internal angle of the orbit, the speaker said he wished to emphasize the point that whenever the operator used this route, he interfered with the pulley of the superior oblique muscle of the eye. In a large series of cases done in this way, a certain number would have permanent trouble from interference with the muscular balance.

Dr. Coakley said that he did not shave the eyebrow in his cases, because the hairs usually came out coarse, and did not match those of the opposite side. Dr. Mosher thought it was more surgical to shave the eyebrow before operating, and in order to cover the objection raised by Dr. Coakley, both sides might be shaved.

Dr. Lewis A. Coffin, of New York, said he thought Dr. Richards struck the key-note when he said that one operation could not be expected to fit all cases. There were certain cases of frontal sinus disease in which the open method of treatment was undoubtedly indicated; there were others in which it should not be done. The speaker said he was certain that Dr. Coakley was willing and found it necessary at times to get away from any stereotyped method of operation.

In regard to skiagraphy, Dr. Coffin said it was a very beauti-

ful and instructive method of demonstrating the size of the sinuses and their relation to one another, but he doubted the statement made by one of the speakers that it showed diseased conditions of the sinuses. He did not believe that the X-Rays demonstrated the diseased sinuses in any way, shape or manner. In taking these skiagraphs, the light had to pass through various layers of bony and soft tissues, as well as the brain and the air cavities, and it would be expecting a great deal of the rays to have them demonstrate the presence of pus or diseased membrane in the accessory sinuses. The fact should not be lost sight of that skiagraphic pictures of the object were not constant quantities, even by the use of the same tube, and, as far as possible, under the same conditions.

In regard to the various operations for frontal sinus disease, Dr. Coffin said that much depended upon the size and condition of the sinus. In dealing with a very large sinus, with many septa, it would naturally take a long time to obliterate it by the open method; in fact, too long. He regarded the Killian method as practically certain, and one that gave perfect results for the large sinuses.

The degree of scarring after the external operation on the frontal sinus by the open method depended much on where the wound was kept open for packing, because there was sure to be more or less retraction at that point. He advised against splitting the eyebrow, as that would frequently leave a disfiguring scar. The incision, preferably, should be made along either edge of the brow.

Dr. Coffin, in differing with Dr. Coakley, said he had seen cases in which there was undoubted independent disease of the frontal sinus, none of the other sinuses being involved. He regarded Dr. Berens' operation as certainly an illustration of heroically radical work. In his paper, Dr. Berens had reported several cases as suffering from dry pharyngitis following this radical operation. This was not at all surprising, as the functional integrity of the nose had been entirely destroyed, and nothing was left the patient but a large, irregular hole.

In conclusion, Dr. Coffin said that if the surgeon, in operating on these cases, found it necessary to be radical, he should at all times be conservatively so.

Dr. C. G. Coakley, in closing, said the discussion of the papers composing this symposium had brought out many good points. In the first place, the men who had advocated the so-

called conservative treatment had done so in a very able manner. He regarded Dr. Ingals' operation as a valuable addition to the conservative or intranasal methods of reaching the frontal sinus. It certainly would seem to give better drainage than any of the other intranasal operations with which he was acquainted. One possible danger of the method was the accidental perforation of the brain, and the setting up of a septic process, as the curettage of the sinus was done blindly. Still, Dr. Coakley said he expected to give the method a trial next Fall, and hoped for as good results as Dr. Ingals had obtained.

The speaker said he was perfectly in accord with the statement made by Dr. Richards that one operation could not be expected to fit all cases. The operation should be varied according to the indications met with; according to what the skiagraph showed, according to the size and shape of the sinus, and its condition. Dr. Loeb struck the key-note when he called attention to the value of the personal equation, which certainly had a great deal to do with it. Dr. Coakley said the reason he had not done the Killian operation was that he was not familiar with it, and the results he had obtained from his own method were so good that he had not been tempted to try any other. If the Killian operation gave better results, with less deformity, the speaker said he would be willing to substitute it for his own in suitable cases. He would gladly concede the superiority of that method when he became convinced of it.

Dr. Coakley said that in his paper he had touched upon the question of an exploratory operation on the frontal sinus, and in certain instances he thought that that was a perfectly justifiable procedure. He could recall cases where he entered the frontal sinus, and finding that a radical operation was uncalled for, he had simply closed the wound, which healed with practically no resulting deformity.

The value of skiagraphy should not be overlooked in dealing with these cases. If Dr. Haskin had resorted to it in the case he reported, the source of the trouble would probably have readily been discovered. The speaker said he had found the X-Rays very valuable in dealing with abscesses caused by aberrant teeth. In dealing with disease of the sinuses, skiagraphy did not always show the presence of disease, but a good negative always showed a marked difference between a normal and diseased sinus.

Dr. Coakley said that while the method demonstrated by Dr. Richards caused less deformity than his own if the sinus was small, it was difficult, he thought, by the former method, to gain access to all the recesses of the sinus. In some cases the sinuses were narrow, or we had to deal with multiple septa, and in such instances it would be very difficult, with any currette with which he was acquainted, to get out all the mucous membrane, and unless that was done, the mucous secretion would continue, and obliteration of the sinus would not occur. The only bleeding that occurred in the course of the operation was from the mucous membrane in the sinus, and after that was removed, together with the granulation tissue, the field was absolutely dry.

In connection with his paper, Dr. Coakley showed two patients upon whom he had operated by the method described.

Dr. T. Passmore Berens, of New York, in closing, said that in the discussion of the papers on this subject, Dr. Clark had criticised the radical operation from the standpoint that these cases could frequently be cured by less radical measures. Dr. Berens said that in his own paper he had emphasized the point that he only resorted to the radical operation in cases where milder methods had failed. In his case of pan-sinusitis referred to by Dr. Coffin, the patient had previously been under the care of two eminent rhinologists, who had failed to give him relief. The case was a very severe one, the constitutional symptoms being such that a meningitis was suspected. The local conditions were such that an intranasal operation for the relief of the sphenoidal and ethmoidal disease was out of the question. One of the rhinologists who had previously seen the patient concurred as to the necessity of an operation, and was highly pleased with the result obtained.

Dr. Berens said it was only in those cases of chronic suppurative disease where palliative measures had failed that we were justified in resorting to a radical operation, whether the disease involved the ear or the accessory sinuses of the head. In dealing with these cases of disease of the accessory sinuses, in order to effect a cure, none of the involved cells should be overlooked, and drainage should be made complete.

In reply to Dr. Coffin, Dr. Berens said he thought the nose was still a useful organ, even when "turned into one of those great, big ragged holes." In the operation he had described, the inferior turbinate and the entire mucous membrane of the

septum were always left intact, so that there still remained a large area of healthy, secreting mucous membrane. Any one could readily convince himself of that fact by seeing one of these patients undergoing an attack of coryza, which was good evidence that the operation did not destroy the function of the nose entirely.

Dr. Berens said he would be pleased to see the operation described by Dr. Ingals, but he was strongly opposed to injecting even a weak solution of commercial hydrogen dioxide through a canula into the frontal sinus. In some cases in which that cavity was affected, the disease extended to the dura, and such an injection would be very apt to set up an infection of the meninges.

XXXIII.

ADDRESS OF THE PRESIDENT.*

BY

FREDERIC C. COBB, M. D.

BOSTON.

Gentlemen of the American Laryngological, Rhinological and Otological Society, we welcome you to Boston at the eleventh annual meeting of the society. To express to you all the gratification which I feel at the honor you have done me in electing me your president is impossible. It will give me greater pleasure if this meeting shall prove as successful as its predecessors, both in its scientific and social aspects. An ideal medical meeting should be, in my opinion, an interchange of views, honest and sincere even if divergent and opposed, as a trial is made up of every possible presentation of a case. The society, as a well educated jury, must decide upon the merits of the pleas presented by the readers. Above all, truth and light are what we seek. Let us do so with open minds, unprejudiced and willing to yield our most cherished beliefs if evidence can be produced to show that we are wrong. Does this plea appear to you unnecessary? Remember the storm of vituperation which followed Jenner's glorious discovery of vaccination. Remember the disbelief which in very recent years Klebs-Loeffler's bacillus, and later antitoxin, had to undergo. We must demand proof, and clear scientific proof, and not assertion merely; but if we receive it let us accept it gladly, willingly and enthusiastically.

How numerous have been the operations devised upon the nasal septum, and how many of their originators will say frankly in a medical meeting to-day that their methods have since been improved upon? And yet in our hearts what respect have we for him whom adheres to old operations only because he has devised them!

May our papers be careful and thorough and our discussions fearless and unprejudiced, with the one object in view of attaining the truth, irrespective of personal motive or inter-

*Delivered before the American Laryngological, Rhinological and Otological Society, Boston, June, 1905.

est. So shall we not only maintain the high standard of this society, so dear to us because we have reared it from its cradle and watched its growth with delight and pride—but also raise it to such eminence that any man shall be able to point to its transactions as the wisest, fairest and most progressive work in the specialty it represents.

The foundation of this society and its phenomenal success rest upon this one principle, to be fair to all and to give to every worthy specialist the opportunity to demonstrate his power publicly, to meet others and to exchange his best for theirs. This is the essence of true democracy, and it can only be a failure when self-seeking and demagogism take the place of public spirit and a desire for truth.

Men in older associations are sometimes surprised at the enthusiastic devotion shown to this society by its members. The reason may perhaps be found in the fact that membership in the older associations is rather a reward for long, successful service in the specialty, than a helping hand when it is most needed. When we have climbed to the top we enjoy the appreciation of others. But we never can forget the hand that helped us while we were climbing and the encouragement that cheered the dreary path.

No one who will study the earlier transactions and compare them with the present, can fail to be proud of our progress, not only in the kind and variety of subjects treated, but in the scientific research and accuracy of observation shown. The section meetings have been eminently successful and have demonstrated the wisdom of continuing them. To my mind, nothing shows our progress so much as do these section meetings. A few years ago we should have been justly proud to have had such programmes at our annual meetings as we now have at the sections. During the past year the activity of our members has not decreased. It is impossible in the space allotted to do more than allude to the excellent work of Coakley, Luc, Freudenthal, Turner, Coffin, Kyle and Mosher on the frontal sinus, and of Richards, Stucky, Berens on the general subject of sinus diseases; while we find intra-nasal surgery and deformities of the nose represented by Richardson, Gibb, Mosher and Berens; papers on the pharyngeal lesions by Myles, Packard, Cline, Ingals, Leland and Hopkins, and neuroses by Hudson McCuen. These contributions and many others in the transactions of our sections may serve to give an idea of the activity of members of this organization.

And now, gentlemen, it is my pleasant duty to welcome you to Boston in the name of your Boston fellows and in my own. We have tasted the hospitality of the South in Kentucky, and of the West in Chicago and Cincinnati. Washington has shown us her wonders, New York her wealth and luxury, and Pittsburg her industries. Boston can show you monuments of the past which have been a large factor in making this great country what it is—a university which founded among the first in the land, has always stood and stands today for the best of all knowledge and progress in America, and a Medical School, recently endowed with magnificent buildings and equipment, which will, we hope, enable us to do better work in medicine and surgery than has hitherto been possible anywhere. To those interested in hospitals, the Massachusetts General, the Eye and Ear Infirmary and the City Hospital will appeal as having the newest ideas in construction and in management.

The contagious department of the City Hospital, which is under the management of Dr. McCollom, is a model in antiseptic construction, and has, we believe, the best possible appliances for the treatment of contagious diseases.

The new out-patient department of the Massachusetts General is solving one of the great problems in out-patient work, which has been to so regulate records that they shall be of value as statistics and yet shall not fall into the hands of the patient, to be conned over and reported in a garbled form elsewhere. As the patient arrives, his record on a large card is sent to the department to which he is accredited by the admitting physician. On reaching this department the patient is brought to the physician in charge and the card bearing his name has entered upon it the diagnosis and treatment required. The patient is then dismissed and his card is sent down to the out-patient office, where it is indexed both under the head of name and of diagnosis. In this way the patient himself does not see the entries made as to his symptoms or disease, while the physician is enabled to refer to the office for reports of classes of disease, or for names of patients which he requires. Should the patient be transferred for opinion or for treatment to another department, his card is so marked and a page carrying it conducts the patient to the designated specialty. Thus every card records all opinions delivered by the authorities of each department the patient may visit, and a large library of clinical cases is rapidly being accumulated.

It may not be amiss to allude in a few words to the teaching of laryngology at present in use in the Harvard Medical School, since most of us are interested in this class of work. Laryngology is taught in the third and fourth years of the course, lectures being given once a week during the latter half of the third and first half of the fourth year. The whole number of students is divided into sections and clinically instructed in the use of instruments, technique and diagnosis at the various hospitals, under different instructors, each student getting about twelve exercises. The study of anatomy of the sinuses, of the nose and throat has been introduced and is taught by one of our members. It seems to me that the study of anatomy of this specialty by the students marks a distinct advance.

In the new out-patient department already alluded to, a room is set apart for anatomical and pathological specimens of nose and throat diseases. The study of sinuses and newer methods of examining the trachea and esophagus have greatly broadened our specialty, so that the time given to the study of laryngology seems ridiculously small. The student is most carefully instructed in the more important surgical operations, which without years of study and practice he can never attempt, and which naturally he will seldom see. The whole number of hours given to surgery is about 583, to laryngology and otology 135. Does the general practitioner see over three times as much surgery as he does of nose, throat and ear diseases, and, more important still, does he do three times as much of it?

Time forbids, gentlemen, that we should go more fully into this subject. We have a long and interesting programme before us, and I declare the 11th annual meeting of the society open for the transaction of business.

XXXIV.

OBSERVATIONS IN TWO HUNDRED CASES OF MASTOID DISEASE WITH OPERATIONS.

BY

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SURGEON TO THE EAR, NOSE AND THROAT DEPARTMENT OF THE RHODE ISLAND HOSPITAL.

This paper is simply a testimony of personal experience in the operative treatment of mastoid disease and its complications as occurring in the run of practice, hospital and private, emphasizing important symptoms and indications for operation, showing the method of operation, the method of closing the wound to get the quickest healing, as by "modified blood-clot" and other methods.

Of these two hundred cases, one hundred and fifty-eight were acute, and forty-two were chronic. The duration of illness in the acute cases varied from one to six weeks, the majority being between two and three weeks; the chronic cases from four to twenty-five years. The causes of the inflammation in the acute cases were scarlet fever, six cases; measles, two cases; typhoid fever, one case; the remaining one hundred and forty-nine cases were grip or some form of influenza, and occasionally tonsilitis. Other unusual causes were: a skull fracture extending through the temporal bone which became infected, involving the styloid foramen and facial nerve; another, tubercular glands of the neck which broke down and eroded the mastoid cortex causing necrosis of the bone and cell structure; another, adeno-carcinoma involving the cartilaginous meatus and the squamous and mastoid portions of the temporal bone; another case occurred in a diabetic patient, but I cannot say that diabetes was the cause. In this case healing was slow but recovery from the mastoid and ear conditions was complete in fifty days.

SYMPTOMS.

It is not my intention in this article to go into the symptomatology of this disease, but simply to call attention to the more important or positive indications for operation.

The cases with typical symptoms, namely, phelegmonous swelling over the mastoid region, were operated on without preliminary treatment as soon as arrangements for operation could be made. Cases with only slight edema over the mastoid region were treated for palliative means as ice, dry heat or leaches and irrigation for from four to six days or longer, if the patient's condition seemed improved. If there was no improvement, however, in three or four days and the positive indications for operation were present, then operation was performed. Naturally I am guided to a decision by indications commonly known to otologists. We cannot wait for typical symptoms as traditionally given, as in the majority of cases these symptoms are absent when the case presents itself.

Among the subjective symptoms, the principal one was pain, just after midnight, generally between twelve and two A. M. The patient would seem fairly comfortable during the other twenty or twenty-two hours of the day, and sometimes children would appear very well, even playing about the room during the day so that the parents could not see any need of operation, believing the child to be improving. But for two or three hours at midnight it would arouse the household with its cries, from pain in the ear and side of the head, which would subside by two or three o'clock, until the next night. This symptom has been to me the principal indication for operation in many cases.

TENDERNESS.

Tenderness on pressure over the mastoid region is also of great importance and is nearly always present at one or more of three points, namely, over the tip, over the posterior meatal fossa, and deep in, just behind the tip, over the openings of the emissary veins. When tenderness is persistently present, operation is advisable, although its absence does not contraindicate operation, as I have operated several cases where there was no tenderness at either point mentioned and found pus.

TEMPERATURE.

Temperature is not much of a guide except in septic conditions of the system, and in sinus or intracranial involvement where it is invaluable and should be taken and recorded every three or four hours.

PROFUSE PURULENT DISCHARGE.

A profuse discharge of pus from the ear, where the canal is refilled within an hour or two after irrigation, in a case where otitis is continued for ten days or more, to me is an objective symptom of great importance. I say ten days because we have all seen many cases of acute suppurative otitis media where the discharge has been profuse and yet the patient recovered without mastoid involvement.

THE MEMBRANA NIPPLE.

The nipple-like protrusion of the upper posterior quadrant of the drum head is indication of a violent inflammation of the antrum, and is in the majority of cases an indication of mastoid involvement. I have seen three cases, however, where this symptom was prominent and other indications were present and the operation advised and refused and the patient recovered, after several weeks, from the inflammatory symptoms, but there was a loss of from fifty to seventy-five per cent of the hearing in the affected ear in each case. This suggests the advisability of operation in these cases, if for no other reason than to preserve the hearing. for in the cases operated upon the hearing is nearly normal, often quite so.

SAGGING OF THE CANAL WALL.

The sinking in of the upper posterior wall of the bony meatus at its inner end, that is, flattening out of the curve of the canal at this point, is nearly always present after the first week of inflammation, and sometimes earlier. This is a positive indication for operation.

BLOOD EXAMINATION.

The clincal examination of the blood is a helpful aid to diagnosis, and as a matter of routine should be practiced in every case. When the white count is from sixteen thousand to twenty thousand or above, we are led to believe there is

pent up pus somewhere, and in the presence of other mastoid symptoms we feel justified in operating. This is especially useful in the intracranial complications. In a recent case of brain abscess which appeared to be progressing favorably as far as temperature, pulse and general condition of the patient would indicate—in fact he was sitting up in bed, playing with his toys and said he felt all right—the white count, which was taken every three or four days and had been running about 12,000, was found to be 28,000; the dressing was soon done and the wound opened with a probe and about half an ounce of pus escaped from the brain. Had it not been for the blood examination, serious trouble might have resulted before the reaccumulation of pus was evident. A polynucear count of eighty per cent or over gives evidence of septic infection.

LUMBAR PUNCTURE.

Lumbar puncture was practised in two serous meningitis cases giving immediate relief to the brain pressure symptoms; and I think in other cases, that appear to be serous meningitis, I should defer craniotomy until I had seen the results of the lumbar puncture, for the relief is immediate to cerebral pressure and brain symptoms. How lasting or how curative it may be is yet to be determined. Great care should be used in craniotomy in serous meningitis cases as injury of the brain substance might result in necrosis from infection from infected cerebro-spinal fluid.

BACTERIOLOGIC EXAMINATION.

Bacteriologic examination of the discharge from the canal is of some value, although I should not feel like operating simply from finding streptococcus in an acute otitis without other positive indications. For I have found frequently pure positive indications. For I have found frequently pure culture culture of streptococcus in acute ears which have resolved without mastoid complications.

THROMBOSIS OF THE LATERAL SINUS.

In the cases complicated with thrombosis of the lateral sinus the peculiar zigzag temperature curve, oscillating up and down from 99 degrees or lower to 104 or higher has always been present, in one case reaching 106.5 degrees. In one case, however, a messenger boy came into the clinic one morning right

from his work simply on account of ear ache and was referred to the house and operated on in the afternoon, when the mastoid was found necrotic with a perforation into the sinus which contained a clot one and a half inches long with free pus in the centre. Pain in the head on the affected side was present in every case as was also chills, except in the case just mentioned. Nausea and vomiting were prominent symptoms in some cases. Optic neuritis in both eyes was present in one case, the cord-like swellings of the neck were not in evidence. Swelling over the tip extending downward was present in one case, the other cases had no external evidence.

SINUS PHLEBITIS.

This condition was present in four cases all of which showed a similar temperature curve as is common in thrombosis, but not as long oscillations. The systemic condition seemed of greater gravity than the finding at operation would warrant; but the relief was so immediate and complete that there seemed no question as to diagnosis. Streptococcus was found in the cultures.

BRAIN ABSCESS.

These cases seemed to hold their reputation for obscurity of evidence. In two cases I was not suspicious of brain abscess before operation. The patients had both been attending their daily occupations regularly and consulted me on account of pain in the ear and headache, nothing unusual for otitis, and at operation a tract was found leading to the abscess directly over the mastoid roof, as large as a walnut in each case. In other cases, headache, irritability of temper, wanting to be let alone, emaciation, vomiting, peculiar temperature and pulse were among the prominent symptoms.

CEREBELLAR ABSCESS.

In the one case of this complication there were marked symptoms of brain pressure, convulsions, vomiting, hemiplegia and hyperesthesia of the affected side, this being on the opposite side from the abscess, divergent strabismus, euphoria, dialation of both pupils, optic neuritis and coma which lasted thirty-six hours after the operation, after which there was gradual improvement and complete recovery.

FACIAL PARALYSIS.

This condition was present in nine cases before operation. Seven recovered completely after operation, one case was temporarily made worse by operation but recovered in about five weeks to as good a condition as before. Good fortune was with me in not having in the whole series any facial paralysis subsequent to operation which could be attributed to injury of the nerve.

PREPARATION FOR OPERATION.

For five or six hours, if possible, before the operation a biclorid of mercury poultice is applied to the side to be operated upon. The head is shaved for two or three inches around the auricle; in women this extensive shaving is not done, but simply the clear skin just back of the auricle is shaved, not disturbing the hairline, for I find I get along with the patient much better during the succeeding weeks, and I do not see but that the results are just as good as when a large area is shaved; in men and children the region of operation is shaved as a matter of convenience. After the biclorid poultice is removed at the time of the operation, the hair is soaked with ninety-five per cent alcohol and covered with a rubber cap and towel wet with biclorid. In all cases the field is thoroughly scrubbed with ninety-five per cent alcohol after the removal of the poultice. The canal is then thoroughly cleansed by irrigation with saline solution followed by alcohol, and the first step in every operation in acute or sub-acute cases is to make incision through the drum head from top to bottom in the posterior half no matter how many perforations may have been made before. If a good opening exists, it may be enlarged to the limit. This is very important for drainage after the operation. It is naturally presupposed that the operator, assistants, nurses and all instruments and dressing are thoroughly sterilized and the general principles of operative aseptic surgery observed to the letter. The usual incision following the curve of the auricle one-fourth of an inch behind its insertion is made, or as near this as can be judged where phelegmonous swelling is present. The curve, however, is not followed at the lower part as a straight down cut when the tip is reached affords, I think, better access to the cavity for cleansing during and after treatment. In a general way the typical operation as devised by

Professor Herman Schwartze is done with modifications to suit each case. Gouges and curettes are the instruments used to remove necrotic tissue. Gouges similar to Schwartze's and curettes after the pattern of Blake suit me the best. The only rule I have for operating is to remove all necrotic tissue much or little. If this is not done thoroughly, quick healing and protection of the patient against infection cannot be assured. I have rarely found it necessary to remove all of the outer cortex; I aim to save as much of the healthy bone as possible to form a support for the surface in healing. This leaves less depression and in most cases there is none left after healing is complete. The opening in the cortex in adult cases is usually from three-eights to a half inch in width and extends from the suprameatal spine to the lowest level of the tip. This affords complete drainage. Naturally, in extended necrosis, it is not always possible or even wise to save much of the cortex, but in my experience these cases are in the minority. In most cases, after the cells and all necrotic bone are removed, the cavity is irrigated with saline solution. Some cases, however, are not irrigated at all but simply mopped out with sterilized gauze. It seems to me that the drier the wound can be kept the more rapid will be the healing process. But of course, in extensive empyema and necrosis it is necessary to irrigate.

A word regarding commonly called antiseptic solutions. For the purpose of cleansing the ear or mastoid wounds, much has been said and written about using solutions of biclorid of mercury in the strength of one to ten thousand to sterilize the canal or make the wounds aseptic. Now laboratory experiments have shown that it requires at least one hour to kill staphylococcus of different varieties in a test tube culture where the colonies are submerged in a one to five thousand biclorid of mercury solution. To kill the streptococcus takes nearly as long. Now it seems to me that, if it requires an hour to destroy these micro-organisms when submerged in a one to five thousand solution of biclorid of mercury, the simple exposure that would result in the two or three minutes irrigation of the infected parts would hardly be enough to destroy the micro-organisms. And biclorid in stronger solutions than one to five thousand is an irritant to the delicate tissues of the canal, frequently causing eczema and other uncomfortable irritations in the ear beside the danger in children of these stronger

solutions reaching the throat through the Eustachian tube. It seems to me that irrigation with the milder solutions as saline solution or bicarbonate of soda solution which will thoroughly cleanse the canal and remove the sticky mucus and epithelium is safe, effectual and more desirable. I think our prevention of infection is due to removing the pus as often as possible and keeping the infectious organisms away from the parts as well as it is possible to do rather than by any antiseptic irrigation. Where there is profuse discharge from the wound I have it dressed twice a day. When a large amount of necrosis is present either in the soft parts or in the bone, I find swabbing of these areas with ninety-five per cent of carbolic acid followed by ninety-five per cent of alcohol a very successful way of sterilizing the cavity after the tissues have been removed.

The form of operation has been as follows: Schwartze typical in one hundred and fifty-eight cases; semi-radical, four cases; radical, thirty-eight cases. Five of the typical cases were bilateral; and two of the radical cases were bilateral; two of the semi-radical cases were made radical, one fourteen months, and one four and a half years later by subsequent operation. And seven of the typical cases needed a second operation on account of extended necrosis; four of them three months later, one of them four months later, one three weeks later, and one four weeks later.

CONDITION FOUND AT OPERATION.

Typical symptoms as edema, swelling and redness were found in eighty-five cases, the soft parts varying in thickness from one-fourth of an inch to one and a half inches. The supra-meatal spine was present in most of the adult and all adolescent cases. The thickest cortex was one-half inch, from that all grades of thickness down to a perforation. The location of the sigmoid groove was generally from three-fourth to one inch behind the canal; one case was an eighth of an inch, one one-fourth of an inch, and one three-eighths of an inch behind the canal. The cells in most of these cases were necrotic, softened, containing fluid or cheesy pus and pyogenic granulation tissue. Either pus or serum containing streptococcus, which would soon have become pus, was found in the cells in every case so that I do not feel that any case was opened unnecessarily.

There were three cases which might be called Bezold cases.

Only one, however, of these had a spontaneous perforation of the medial side of the tip. Gravity abscess of the neck was present in three cases extending from two to three inches below the tip under the sterno-cleido-mastoid muscle. Necrosis was due in one case to tubercular glands of the neck. In five cases, pus was found burrowing under the tissues of the scalp in varying degrees extending from two inches from the meatus, in some cases, to the outer angle of the orbit, and almost the medial line of the vertex in others. Sequestrum of the external auditory canal was found in three cases; malignant growth of the mastoid and the squamous portion, one case; thrombosis of the lateral sinus, eight cases. Six of these recovered without ligation; one died of pyemia with metastatic abscess, eighteen days after operation. Another died of lepto-meningitis fourteen days after operation. In these two cases the system was so widely infected at the time of operation that ligation of the internal jugular vein would have been of no use.

Sinus phlebitis was found in four cases, all of which recovered. Extradural abscess was found in four cases, one of which showed three independent abscesses, one over the root of the zygoma, one over the roof of the tympanum and the roof of the mastoid. This case was also complicated by a thrombosis of the sinus. All of these cases recovered. Serous meningitis complicated three cases, all of which died. Dementia was present in two cases, one sixty-five years of age, and one seventy-one years of age. The first one took on the form of somnambulism, three weeks of the patient's life being absolutely blank. One case had what might be called a dry necrosis. This patient never remembered having had ear ache or any distress in the ear except a slight deafness for which she consulted me, and which dated several months back. When first seen by me, only symptoms of tubotympanic catarrh were present which was readily relieved by catheterization. About a month later the patient consulted me again with swelling behind the ear which was very tender. The middle ear showed no evidence of inflammation, the drumhead and canal were practically normal. At the operation the bone structure was one mass of softened necrotic tissue intermingled with thick cheesy pus. The whole inner cortex of the mastoid was destroyed. One case of purulent meningitis was the result of trephine injury. The surgeon who first operated the case

attempting to open the mastoid with a trephine had missed the mastoid entirely and cut a button of dura and brain tissue along with the button of bone. The patient was unconscious when admitted to the hospital. One patient had both mastoids involved, and I intended to open both of them, but a large mass of adenoids and two enormous tonsils were present which obstructed the breathing and delayed the operation so that, after the operation of one mastoid and the removal of this lymphoid tissue in the throat, it did not seem best to open the other mastoid, but a large incision was made in the drumhead of the other ear which gave better drainage and depletion. This patient made a good recovery and the unoperated mastoid resolved without further trouble. Here is a case where I think that the depletion from the removal of the adenoid tissue and the establishment of better conditions in the throat saved the mastoid operation. And I think in a number of cases of acute middle ear with mastoid tenderness, a number of other mastoid complications have been prevented by the removal of the adenoids when the ear was in the acute condition. There is a possible danger of infection in undertaking such an operation while the ear is acutely inflamed, but with the Eustachian tubes tightly closed as is usual in these cases I do not think it has very great certainty; in my experience, at least, there have been no bad after effects, on the other hand it has been beneficial.

METHOD OF CLOSING THE WOUND.

I have not followed the traditional way of closing the mastoid wound, i. e. by leaving the surfaces to granulate in, as I believe that the large amount of freshly cut surface leaves too great an area for infection; certainly this method is slow in healing, requiring from six to ten weeks, and the exuberant granulation tissue which so quickly forms on the surfaces is extremly troublesome in many cases. In all of these cases the wound has been closed to a greater or less extent. In the first three cases a rubber drainage tube was inserted in the cavity and the wound closed by sutures, above and below it. This was then discarded and wicks of gauze were used instead. The wick of gauze about three-eighths of an inch in diameter was placed in the cavity and brought out at the bottom of the incision. The rest of the wound was closed by from four to six or more stitches as the case required. For the past two years I have used what is known as the cigarette drainage devised by

Dr. Halstead of Baltimore, which he calls "protective drain," which is a soft rubber tube containing a wick of gauze. This I find causes less discomfort, when the first dressing is done as the tube can be removed without the slightest pain to the patient. The dressing of gauze sponges and bandage is now applied, and if all goes well, is left for four or five days undisturbed. At the first dressing the rubber drainage is removed and the cavity is wiped out with sterilized cotton. Irrigation is not used until pus is found. Many of these cases have healed without the need of irrigation and without the formation of pus, simply a discharge of clear serum being present during the first week or ten days, after which the wound is allowed to close. The duration of healing in these cases is shown below. In the radical cases the Stacke or the Zaufal operation or some modification, was performed in most cases, in some cases with extensive necrosis the Schwartze radical was used. With the exception of the cases where necrosis was extensive, the incision behind the ear was completely closed in most cases at the time of operation by sutures, and the subsequent dressings done through the canal. The early cases were tamponned closely at the time of the operation, but the removal of these tampons caused such intense pain to the patient at the first dressing that I do not now tampon at the operation but shape the canal on a piece of rubber drainage tube after turning in the flaps and making the canal as large as the case requires. This is left in for two weeks and cleansing is carried on through this opening. At the end of two weeks the tube is removed and the cavity thoroughly cleansed and tampooned closely (not tightly), each day until epidermization is completed, which is from six to twelve weeks in most cases.

DEATHS.

Fifteen cases died, four of pyemia, three of serous meningitis, three of brain abscess and meningitis, two of purulent meningitis, one of septicemia, one of shock—a child two months old—and one of adeno-carcinoma, eight months after operation. All of these cases except the two months' old baby, died of complications well established before operation. The operation being performed merely as a chance to save life. Several of the cases were unconscious before operation. The patients who died would have died without operation and perhaps some men would not have spoiled their statistics by attempting a

case which was practically moribund when admitted to the hospital. It is interesting to note that among the older people where death might be more commonly expected, there were only two deaths, one at seventy-nine, of septicemia; and one at sixty-five, of brain abscess.

THE LENGTH OF TIME REQUIRED FOR HEALING.

Number of Days.	Patients.
10	1
12	1
13	4
7	1
14	20
15	10
16	2
17	7
18	18
19	5
20	4
21	5
22	3
23	3
24	5
25	1
26	6
27	3
28	5
32	4
33	3
34	1
35	1
36	1
37	1
38	1
39	1
40	1
41	2
42	4
46	1
50	1
51	1
52	2

Thus one hundred and four out of one hundred and fifty-eight acute cases were healed in four weeks, twenty-five of these in two weeks, and seventy-six in three weeks. The healing process was delayed in the case of diabetes, and in other cases by extensive necrosis or low vitality of the patient. In favorable cases a modified blood-clot method of healing was utilized and a large percentage of these were successful as shown by the rapid healing.

PRIVATE VS. HOSPITAL CASES.

I find that cases in private houses heal much more quickly than the average hospital case. Infection is more likely to occur in a large general hospital than in private hospitals or private houses.

The bacteriologic examination showed streptococcus in thirty-nine cases; staphylococcus albus, eight cases; staphylococcus pure, one case; staphylococcus albus and aureus, two cases; streptococcus and staphylococcus combined, four cases; diplococcus, one case; unidentified and encapsulated diplococcus, three cases; in two cases, pure culture. These latter organisms which are somewhat unusual in mastoid disease were described by Dr. Mary S. Packard in the Journal of Medical Research, March, 1903. I regret that more cases could not have had bacteriologic examination, but it was not possible under the circumstances.

COMPLICATIONS FOLLOWING OPERATION.

Septic arthritis in two cases (one streptococcus infection, the other unknown); both cases recovered. Streptococcus infection of the skin of the face and scalp resembling erysipelas in two cases; one of these patients, seventy-nine years old died.

THE AGES OF THE PATIENTS FOLLOW.

No. of Patients.	Age of Patients.	No. of Patients.	Age of Patients.
1.....	6 weeks 3 days.	1.....	15 months.
1.....	3 months.	1.....	16 months.
1.....	3½ months.	1.....	22 months.
1.....	4 months.	2.....	2 years.
2.....	7 months.	8.....	3 years.
1.....	9 months.	1.....	3½ years.
2.....	14 months.	1.....	3 years 9 months

No. of Patients.	Age of Patients.	No. of Patients.	Age of Patients.
1	4 years.	1	31 years.
4	5 years.	2	32 years.
8	6 years.	5	33 years.
4	7 years.	2	34 years.
3	8 years.	7	35 years.
4	9 years.	4	36 years.
3	10 years.	1	37 years.
3	12 years.	2	38 years.
1	13 years.	1	39 years.
5	14 years.	6	40 years.
4	15 years.	2	42 years.
3	16 years.	1	43 years.
3	17 years.	3	45 years.
2	18 years.	1	46 years.
5	19 years.	1	48 years.
3	20 years.	1	49 years.
1	21 years.	2	51 years.
5	22 years.	1	56 years.
4	23 years.	1	60 years.
1	24 years.	1	61 years.
7	25 years.	3	65 years.
2	26 years.	2	70 years.
3	27 years.	1	74 years.
4	28 years.	1	79 years.
6	30 years.		

It is of anatomical interest to know that well developed mastoid tips containing pneumatic cells are occasionally found in infants, as the above figures will show; every case, even in the youngest babe six weeks and three days old, showed mastoid cells external to the antrum.

XXXV.

TINNITUS AURIUM AND HALLUCINATIONS OF HEARING:

OR

THE RELATION OF EAR DISEASE TO AUDITORY HALLUCINATION OF THE INSANE.

By Wm. Sohier Bryant, A. M., M. D.,

My attention was called to this subject in the various aural clinics with which I have recently been connected, by seeing several patients who were seeking relief from imaginary voices.

Careful search in otological literature has given very bare results upon the subject, but I have found the neuro-psychological literature extensive. The search shows, moreover, that hallucinations of hearing are much more common and of greater psychological importance than other hallucinations, and that they are usually the primary hallucinations. In the order of their importance, hallucinations are classified as hallucinations of hearing, of sight, of smell, and of touch.

As early as 1531, Donat (12) described a case of auditory hallucination. Bodin (6), in 1580, in his description of unilateral hallucinations of hearing, portrayed the first indication of a possible connection between the ears and auditory hallucinations, but he did not remark the significance of this phenomenon. A similar description was given by Dom. Calmet (13), in 1751. He also failed to note the importance of the phenomenon. Almost a century later, Baillarger (1), in 1846, makes specific reference to a possible relationship between the ears and auditory hallucinations. This relationship is made more explicit by Köppe (29), in 1867.

There is considerable evidence showing the association of ear disease with auditory hallucinations (1, 2, 7, 8, 10, 26, 29, 34, 46, 49, 51, 52, 55, 59). The results given by a number of observers shows that in the majority of cases of audi-

tory hallucinations, the patients are also suffering from ear disease. In many of the hallucination cases, complaint of tinnitus is also found; in fact, very few cases of auditory hallucination are free from disturbed aural function of the kinds which are usually accompanied by tinnitus.

Unilaterality of some hallucinations of hearing suggest that they may possibly depend on a peculiarity of the ear on the affected side. On examination of the ears, defects are found on this side.

(1, 2, 4, 5, 6, 8, 9, 13, 14, 16, 18, 19, 21, 22, 25a, 31, 32, 33, 34, 35, 38, 40, 41, 42, 43, 44, 45, 46, 47, 51, 52, 53, 55, 58, 60, 61, 62, 63, 64, 65.)

Without exception, unilateral auditory hallucinations are lateralized on the same side as the constantly present ear lesions. Furthermore, in most of the cases in which tinnitus aurium is associated with the hallucinations, the dominance of the hallucinations increase with an increase of the tinnitus, and the hallucinations do not continue after the cessation of the tinnitus.

We have, therefore, good evidence that auditory hallucinations are often dependent on ear disease, and that some of the cases are due to stimulation of the auditory centers by peripheral tinnitus aurium.

The unstable condition and hypersensibility of the auditory nerve centers and cortex favor the pathological interpretation of the stimuli given by the tinnitus aurium, and hallucinations of hearing are established. The gravity of the pathological impressions depends chiefly on the degree of psychical instability. They vary from mere conscious illusions to hallucinations under the patient's control, and from hallucinations to dominant delusions.

The psychic classification of tinnitus is as follows: I. The largest class, in which the tinnitus is not heeded by the patient. II. When it is the object of mental disquiet in psychopathic patients, tinnitus causes many nervous disturbances, as hypochondria, neurasthenia, or melancholia and quasi insanity. III. In this class the tinnitus causes auditory halluciations,—group (a) hallucinations which are of slight import and are usually conscious, (b) unconscious hallucinations, but of no great psychic importance, (c) true delusion, usually with persistent delirium which finally becomes organized.

I quote Redlich & Kaufmann's figures (49). His results

are as follows: Number of insane examined 97; number of patients without hallucinations of hearing, 10; patients with normal ears, 11; hallucinations of hearing, 58; abnormal ears, 57; tinnitus, 26 cases; doubtful cases not otherwise tabulated, 29.

I have examined 56 insane at the Manhattan State Hospital, with the following results: Without hallucinations of hearing, 5; cases with normal ears, 4; with hallucinations of hearing, 41; cases with abnormal ears, 42 (mostly non-suppurative); cases with tinnitus aurium, 27; doubtful cases, unable to answer questions, 10.

A large amount of literature shows that auditory hallucinations are caused by stimulation of the sound perceiving apparatus (3, 7, 26, 30, 34, 54). The hallucinations may arise from external sound impression, or from primary stimulation of the auditory centers (22, 23, 24, 36, 43, 45, 60).

The hallucinations usually depend for their inception on stimuli received by the auditory center. The stimuli originating peripherally pass directly along the auditory fibers, or indirectly from other centers along the association tracts. In rare cases the auditory center itself may be subject to primary stimulation, which is due to pressure or to chemical irritants.

The sound perceiving apparatus is abnormally sensitive to electric stimulation, and probably to other stimuli in patients suffering from auditory hallucinations (10, 26). This irritability is often found in the deaf also. It is probably due, as a rule, to the exhaustion which follows the painful effort to hear, when hearing is difficult (17). Probably it also follows the fatigue which results from constant noises, chiefly tinnitus. In a few cases the irritability is due to exhaustion consequent on disease of the nerve centers and brain, as for instance, tumor, etc.

Though the predisposition to the production of hallucination is found in a psychopathic condition, an exciting cause is necessary. This has been illustrated by several authors who have produced artificial hallucinations by stimulation of the auditory apparatus (7, 26, 30, 39).

Tinnitus aurium is a common accompaniment of auditory hallucination and is probably its usual exciting cause. This conclusion is sustained by the number of cases having both

tinnitus and hallucination (1, 2, 11, 20, 25, 26, 27, 29, 33, 33a, 34, 47, 49, 50, 52, 56, 57, 63, 65), and by the remarkable number of cases of ear disease associated with hallucination of hearing. These ear diseases in the physically sound would generally be associated with tinnitus. I have found that the hallucinations fluctuated, together with the tinnitus. This has been noted by others (2, 51, 56). The hallucination follows the course of the ear lesions, unilateral, bilateral, intermittent and remittent, etc. The tinnitus often alternates with the auditory hallucinations. Sometimes they may occur together, in which case they fluctuate together.

The hallucinations which are provoked by external sounds very closely resemble paracusis or after-impression tinnitus aurium (56). They may be excited by any common sound such as a clock ticking or striking, etc.

Some hallucinations of hearing are induced by irritation of the peripheral nerves about the ears, that is; by the stimulation of the trigeminal nerve. This is doubtless the same reflex sensation as tinnitus excited in the same manner. Alterations in the circulation which are known to affect tinnitus also affect hallucinations (20). The condition of the naso-prarynx which is a very importat factor in determining tinnitus is also relevant to hallucination. The congested, inflamed mucous membrane in the acutely insane fades out to its normal appearance during convalescence from the hallucinations. The purulent secretion ceases as the long standing cases of hallucination improve. Trauma of the ears has also been noted as an inducing cause of hallucination (2, 15, 26, 49, 52). It is usually accompanied by tinnitus.

Ear lesions causing tinnitus are an exciting cause of hallucinations on account of the exhaustion of the sound perceiving apparatus from the constant irritation of the tinnitus.

As we might expect from some of the preceding observations, ear disease is sometimes the precursor of hallucinations (1, 2, 8, 20, 25a, 34, 48, 51, 56). The insane whom I examined had chronic ear affection, which in all the cases of recent insanity must have preceded the hallucinations of hearing.

Ear disease both renders the sound perceiving apparatus more impressionable, and also furnished the source of the impressions, namely, tinnitus; in addition, it shuts off from the mind some of the correction and occupation it might get

from external sounds which are normally heard, but which, owing to the concomitant deafness, cannot now reach the auditory centers.

Prognosis. For the above reasons the prognosis of the hallucinations is bad in proportion to the deafness.

Prognosis is good in groups I and II of the psychic classification of tinnitus, and in classes (a) and (b) of group III. It is encouraging in some of the cases of class (c) when the ear disturbance can be wholly overcome. Old age is an important factor as a bad indication in prognosis for hallucinations because of the steadily failing hearing, the concurrent tinnitus which is often due to progressive circulatory changes, and because of the steadily progressive mental deterioration (23, 28, 57).

Unilateral hallucinations do not have much psychic influence, because of their correction by the opposite side. Bilateral hallucinations with normal, or nearly normal hearing, and with remediable ear lesions have a good prognosis. When the hearing is much diminished, the prognosis is bad. For in these cases, the psychic disturbances increase progressively, Finally, the hallucinations become delusions (20).

A few cures of hallucination by ear treatment have been reported (2, 8, 34, 50). These cures were chiefly in suppurative disease of the middle ear and in trauma, besides impacted cerumen and foreign bodies in the meatus. It is difficult to find any mention of the cure of hallucinations of hearing by aural treatment in non-suppurative conditions, although such cures may have occurred.

The following cases of hallucinations are interesting because of their evident dependence on catarrhal conditions of the ears as shown by the cessation of the hallucinations when those conditions are corrected.

Case I. I saw the patient in 1904 at the Vanderbilt Clinic, where she came for relief from the distress caused by hearing voices constantly speaking to her. People she knew across the sea spoke ill of her. Their voices were very real to her. Part of the time she was able to persuade herself that the voices were only imaginary. Occasionally she had visual hallucinations with vivid auditory hallucinations, and saw her brothers who were far away in Ireland, while they upbraided her.

The patient was a psychopathic, single woman of 31, and was not a teetotaler. Her eyes had a wild, restless expression.

Her family history was negative. She was a housemaid. An examination of her ears showed a slight chronic otitis media catarrhalis, and also a slight obstruction of the Eustachian tubes. The mucous membrane of the naso-pharynx was congested. Treatment of the naso-pharynx and catheterization of the Eustachian tube stopped the hallucinations after a few times.

In the spring of 1905 the patient was seen by Dr. Michaelis. She had a mild recurrence of the auditory hallucinations. This time she complained of the men next door, who, she said, had designs on her. Again, the hallucinations soon yielded to catheterization.

Case II. The patient was a housemaid, thirty-two years old, and single. Her family history was psychopathic. I saw her at the New York Eye and Ear Infirmary in 1903. She came to the hospital for treatment and relief from auditory hallucinations which prevented her sleeping. The voices spoke chiefly about things in her mind They said bad things about her. The voices were most annoying in a quiet place and in bed. At night she could not shake off the incubus of their reality, and would try to run away from them.

Inspection showed chronic otitis media catarrhalis of the ears, and a moderate stenosis of the Eustachian tube. She said that she had buzzing and ringing tinnitus, principally in the right ear, and that the sounds of the elevated trains remained in her head long after they had passed. She heard voices in either ear when she put it on the pillow.

Treatment was given by the catheter and the Siegle speculum and by applications of a solution of silver nitrate. Considerable improvement followed. The hallucinations became entirely conscious, or they were only illusions. The voices became lower and gradually unintelligible, and in two months and a half the tinnitus finally ceased.

Case III. The patient, who was seen by Dr. Michaelis in 1905, was a young man and an epileptic. He had auditory hallucinations. His ears were affected by a mild tubal stenosis and by adenoids. He complained of mucous tinnitus. Treatment was given by applications of nitrate of silver solution, which quickly relieved his condition, and the hallucinations promptly ceased.

Case IV. I saw this patient at the Presbyterian Hospital. She was a married woman, thirty-four years old, and had one

child. She was mildly alcoholic. Her antecedents were neurotic. Her father, brother and child were all psychopathic. The patient heard persecuting voices, and also complained of very loud tinnitus of varying character in the right ear and head. There was a history of a running ear. Inspection showed that the left membrana tympani was cicatrized. The right meatus was closed by a cicatrix just external to the position of the annulus. This ear had not discharged for three years. The nose was in a bad condition, irregularities and hypertrophies.

Treatment of the nose quickly lessened the hallucinations, but the tinnitus continued. An exacerbation of the hallucinations occurred in six weeks. The patient was then taken into a hospital, and in three days the hallucinations had ceased and in five days the tinnitus also.

Conclusions. The evidence points out a logical connection between ear disease and hallucinations of hearing.

In a susceptible, psycophatic individual, hallucinations may be excited by the irritation of subjective noises.

Improvement, or cure of the coincident ear affection may logically be expected to cause an improvement or cure of the auditory hallucination.

I wish to acknowledge my debt to the following friends for their assistance in compiling the material for this paper,—Dr. A. E. Macdonald, Dr. T. W. Roe, Dr. Adolph Meyer, Dr. L. C. Petit, Dr. A. M. Phillips, Dr. Alfred Michaelis and Dr. Henri Iskowitz.

BIBLIOGRAPHY.

1. Baillarger.—Des Hallucinations, Paris, 1846, p. 306.
2. Ball.—Encephale, 1882, p. 1.
3. Benedict.—Archiv. f. Heilkunde, 1867, Bd. 8.
4. Bennet, Hugues.—The Lancet, 1889, I. p. 674.
5. Berbignier.—Des Farfades, Airgnon, 1821, t. I, Chap. VII.
6. Bodin.—Demonomanie de Sorciers, 1580, Paris, p. 10.
7. Buceola.—La reazione ellettrica dell' Acustic negli Alicuati; Rev. sper. di Freniatria, 1885, Bd. 11.
8. Buck, Max.—Arch. f. Psych., 1881, XI, p. 465.
9. Capgras, I.—Relations des Maladies unilaterales de l'Oreille avec les Hallucinations de l'Ouie; Arch. de Neurol., 1903, XVI.
10. Chooslik.—Beitrag zur Theorie der Hallucinationen; Jahrb. f. Psychiatrie, 1872, Bd. 11.
11. Dana.—Text-Book of Nervous Diseases, New York, 1904, p. 189.
12. Donat.—Medic. Mirab., Francfort, 1531, lit. XI, Ap. 1, p. 189.

13. Dom. Calmet.—Traite sur les Apparitions des Esprits, Paris, 1751, t. II, p. 371.

14. Fere.—Les Epilepsies et les Epileptiques, 1890, p. 466.

15. Führer.—Ueber das Zustandekommen von Gehörstaeuschungen; Centralb. f. Nervenheilkunde, 1894.

16. Gowers.—Archives de Neurologie, 1891, t. XXI, p. 256.

17. Gradenigo—Die Elektrische Reaction des Acusticus; Centralb. f. med. Wissensch., 1888.

18. Griesenger.—Maladies Mentales, trad. Doumie, 1865, p. 103.

19. Hammond.—N. Y. Med. Journ., 12 December, 1886.

20. Hanel, Franz.—Ueber den Einfluss der Ohrgeraeusche auf die Entstehung von Hallucionen; Diss. Jena, 1894.

21. Higier, Heinrich.—Ueber Unilaterale Hallucinationen, 1894.

22. Holland.—Prage. med. Wochen., No. 44, 1883.

23. Hubrich.—Nervöse Teubheites; Arch. f. Psych., Bd. 5.

24. Ihmels, Ludwig.—Zwei Faelle von Hirngeraeuschen; Diss. Göttingen, 1889.

25. Joffroy.—Les Hallucionations Unilaterales; Arch. de Neurol., No. 2, Feb. 2, 1896, p. 97.

25a. Joffroy.—Clinique de Sainte Anne, 1895.

26. Jolly.—Beitrage zu Theorie der Hallucinationen; Arch. f. Psychiatrie., Vol. IV, H. 3, 1873-4, p. 495.

27. Kayser, R.—Ueber subjective Gehörsempfindungen; Zwangl. Abhandl. a. d. Geb. d. Nasen-, Ohren-, etc., Krankheiten v. M. Bresgen; Bd. 2, H. 6, Halle, C, Marhold, '97.

28-29. Koppe.—Gehörstörungen u. Psychosen; Studien ueber einige Beziehungen peripherischen Erkrankungen der Sinnesorgans zur psychischen Krankheitserscheinungen; Allg. Zeitschr. f. Psychiatrie, 1867, No. 24, p. 10.

30. Köppe. — Ueber Ohruntersuch bei Gehörshallucinationen; Wien. klin. Woch., 1896, No. 33, p. 745.

31. Lick.—Analysed in Neurologisches Centralb., 1892, p. 329.

32. Lugaro, E.—Sulle allucinazioni unilaterali dell 'udito; Riv. di Patol. Nerv. e Ment., 1894, IX, 228-237.

33. Lwoff.—Etude sur les Troubles intellectuelles liés aux Lésions circonscrites du Cerveau; Thèse de Paris, 1890, p. 10.

33a. Lwoff.—Gazette des Hôpitaux, 1893, p. 594.

34. Mabille.—Annales Médic. Psychologiques, 1883, 6th Série, t. X, p. 421.

35. Magnan.—Rapport du Congrés, de Rouen, 1883.

36. Meschede.—Pathol. Anatomische Mittheilungen bei. Hallucinat. Irresein; Zeitschr. f. Psych., Bd. 34, p. 261.

37. Meyer, J.—Ueber einseitige Hallucinationen mit besonderer Berücksichtigung eines Falles von einseitigen Gehörshallucinationen; Diss. Leipzig, 1896.

38. Mickle.—The Journal of Mental Science, 1883, XXVIII, p. 265.

39. Moravcski.—Arvösi Hetilap, 1903, No. 45; Reviewed in Neurol. Centralb., 1904, XXIII, p. 1008.

40. Moreau (de Tours).—De Hasshich et de l'Alienation Mentale; 1845, pp. 331 and 354.

41. Planette.—Sopra un Caso di Allucinazioni Unilaterali; Manicomio, anno XIX, 1903, No. 2.

42. Pick, Arnold.—Unilateral Hallucination; Regis Encephale, 1881, p. 61.

43-44. Pick, Arnold.—Mittheilungen aus den Grenzgebieten der Psychiatrie und Neurologie, Part IV; Wiener klinsch. Wochenschr., XVIII No. 7, 16 Feb., 1905, pp. 159 and 161.

45. Pick, Arnold.—Beitrag zur Lehre von den Hallucinationen; Neurol. Centralb., 1892, No. 4, p. 329.

47. Raggi.—Neurol. Centralb., 1884, No. 4, p. 164.

48. Raggi.—Casi di Allucinazioni Provocate; Rendic. del R. Ist. lomb. di sc. e lett., 97.

49. Redlich, E., und Kaufmann, D.—Ueber Ohruntersuchungen bei Gehörshallucinanten; Wien. klin. Wochenschr., 1896, No. 33, p. 745.

50. Regis.—Encephale, 1881, pp. 61 and 68.

51. Regis.—Des Hallucinations Unilaterales, Encephale, 1881, p. 43.

52. Regis.—Maladies de l'Oreille et Hallucinations de l'Ouie, Jour. de Med. de Bourdeaux, 24 juillet, 1904, No. 30, p. 541.

53. Robertson.—Brit. Med. Journ., 1875, V, II. p. 274.

54. Rorie.—Journal of Mental Sciences, 1862.

55. Schulz.—Décourtis. Mem. D'Acad. Méd., 1889.

56. Seglas et Regis.—Pathogenie et Physiologie Pathologique de l'hallucination d'Ouie; Sem. Med., Bd. 16, S. 297; Journ. de Neurol. et Hypn., Bd. 1, S. 367; Revue Neurologique, No. 15, p. 470.

57. Sepilli.—Contributo allo studio delle allucinazioni unilaterali; N. Centralb., IX, p. 663.

58. Sepilli.—Neurol. Centralb., 1880, No. 21, p. 663.

59. Seriex et Mignos.—Hallucinations de l'Ouie avec des acces de surdité, etc., Revue Neurologique, 1902, X, p. 350.

60. Strohrueger.—Zeitschr. f. Nervenheilkunde, XXI, S. 373.

61. Tomeschewsky et Ssimonowitsch.—Wjestnik psychiatri neuropathalogic, 1888, t. VI.

62. Toulouse et Joffroy.—Les Hallucinations Unilaterales; Archiv. de Neurol., No. 107, S. 97.

63. Toulouse, Ed.—Les Hallucinations Unilaterales; Archiv de Neurologie, 2 Série, I, 1896, p. 103.

64. Toulouse, Ed.—Hallucinations Unilaterales chez une Femme ayant une Lésion circonscrite de Cerveau; Gazette des Hôpitaux, 1892, pp. 594, 609.

65. Wormser.—Des Hallucinations Unilaterales; Thèse de Paris, 1895.

XXXVI.

MENIERE'S COMPLEX OF SYMPTOMS—WITH A CRITICISM ON QUINCKE'S LUMBAR PUNCTURE TREATMENT AND AN ACCOUNT OF THE FIRST RECORDED CASE TREATED SUCCESSFULLY BY HYPNOTIC SUGGESTION.

By T. Wilson Parry, M. A., M. D.

Much has been written on the subject of aural vertigo and its relation to certain other associated symptoms. Besides numerous general text books that devote each its chapter to an inquiry into the consciousness of disordered equilibration, a number of special text books, going further into detail and weighing the opinions and theories of students who are endeavoring to solve some of the difficult and delicate problems that present themselves in connection with this subject, are also before the medical profession. In addition to this I have before me a list of over 260 papers written in English, German, French, and Italian, contributing facts of both analytical and synthetical importance bearing direct relation to that complex of symptoms to which Prosper Meniere first called attention and to which, in consequence, his name has been attached in the various forms of Meniere's "Disease," Meniere's "Syndrome," or Meniere's "Complex of Symptoms."

The first question we naturally ask ourselves is—Are these terms used by the profession as synonyms for one and the same clinical pathologic process, or has there been, in the lapse of time since it was first so brilliantly described by its French discoverer, a re-adjustment of terms, to keep pace with our growing knowledge of the subject?

On inquiry into the literature of the subject there is not the slightest doubt that much confusion has arisen from the indiscriminate applications of the term "Meniere's Disease,"

by authors to various conditions of both the internal and middle ears. The very fact that the term "True Meniere's Disease" exists is a confirmation of this. London otologists, at the present time, distinguish between two conditions. A case is either one of "(a true) Meniere's Disease," or it is one of "Meniere's Syndrome," "Meniere's Complex of Symptoms," or, simply, "Meniere's Symptoms." How does this agree with the consensus of opinion to be found in the literature of the subject to which I have already alluded? The answer is—partly, but not altogether, as follows—A large number of writers disagree with and criticise the "Meniere's Disease," and many others who do not, feel obliged to preface their remarks by an explanation of the term, a necessity which, it must be admitted, implies a weakness and lack of precision in our nomenclature.

I shall try to clarify the problem by defining the conditions that give rise to these similar sets of symptoms. There are three pathologic conditions which have to be considered in connection with this subject, and may be classified as follows:

Class I. *Primary Labyrinthine Lesion (or Irritation)*—(A) An acute exudation or sudden hemmorrhage into the labyrinth. This is the "(true) Meniere's Disease" of all authors. (B) Chronic labyrinthine lesion, not due to the above causes. The causes of the cases of this class are usually obscure. This is the "Meniere's Disease" of some authors and the "Meniere's Symptoms" of others.

Class II. *Secondary Labyrinthine Source of Irritation.*—In this class of cases labyrinthine disturbance is produced by extra-labyrinthine causes. These are chiefly tympanic in origin. This is the "Meniere's Symptoms" of all writers.

Cases of true Meniere's Disease are of extreme rarity. Indeed, so great an authority as Frankl-Hochwart (1), who has searched the whole field of otologic literature, has only been able to collect some twenty-seven assured cases. Gottstein (2), in a period of thirteen years, only came across three. Cases, on the other hand, that I have placed in my Class I, B division, are by no means uncommon. It is in dealing with this class of cases that confusion arises in the minds of clinical observers. In my Class II. are to be found all those cases in which irritation of the labyrinthine nerves is set up, indirectly, by some disease or disorder of the extra-labyrinthine origin. These cases are too numerous to mention, but must not be

omitted from a classification of this kind, as the Meniere's "Complex of Symptoms" may be imitated so closely that the cases are often diagnosed as Meniere's Disease. I say "closely imitated," because there is one point of difference that may be distinguished with ease; this is that the deafness belonging to Class I. is of nerve origin, while that, if deafness there be, in those of Class II., is due to defect or disturbance in the sound-conducting and not in what is, perhaps wrongly, called the "sound-perceiving" apparatus.

I shall now describe the symptoms of "(true) Meniere's Disease" (Class I., Division A), contrasting them with those of Meniere's Disease (so-called); (Class I., Division B), and with cases exhibiting Meniere's Symptoms, but not of primary labyrinthine origin (Class II.). There are three symptoms of primary importance that may present themselves in all three conditions—viz., (1) deafness, (2) tinnitus, and (3) vertigo; and others of perhaps less importance to the diagnostician, but of no small consequence to the patient; these are nausea, vomiting, faintness (even to syncope) and profuse perspirations. In true Meniere's Disease deafness occurs with dramatic suddenness. Previously to a definite day and hour—nay, even to a very moment, there may have been no impairment whatever of either auditory organ. From this moment vertigo and tinnitus simultaneously make their appearance. Vertigo usually occurs in attacks varying in degree from the slightest swimming in the head to the severest paroxysm, when the patient feels either himself or his surroundings whirled rapidly round in one particular direction. His equilibrium being lost, he either falls to the ground or only saves himself from so doing by clutching at objects within his reach, while at the same time he retches or vomits, even to blood. A faintness then steals over him and he breaks out into a profuse, clammy perspiration. The tinnitus remains either as a perpetual singing, humming, or whistling in the ear, or as sudden outbursts of shrill sounds, the noise of falling cascades or reports as if firearms were being discharged.

In Meniere's Disease (Class I., Division B), and in those cases that exhibit Meniere's Symptoms (Class II.) the symptoms usually begin very gradually. To begin with, there is sometimes only occasional singing in the ear and perhaps slight deafness; then the singing becomes continuous, and the deafness gradually but surely increases, till later, when

the deafness and tinnitus become prominent symptoms, vertigo steps in with its alarming paroxysmal intensity, and not rarely, combined with nausea, retching and vomiting, completes the clinical picture of Meniere's Symptoms.

When these "Symptoms" have once set in definitely, it is practically impossible to say, without going carefully into the history of its origin, whether the case in point is one of true Meniere's Disease (Class I., Division A), or one of its counterfeits (Class I., Division B, or Class II.), for the affection is as vexatious and persistent as true Meniere's Disease itself. I have notes in my case-book of many cases of Class I., Division B, and it is remarkable that with all the irksome anxiety to which some of its victims have to submit, their friends are sometimes incredulous enough to regard them as troublesome neurotics.

What is the pathologic interpretation of this group of symptoms? Let us first take those of *true Meniere's Disease* (Class I., Division A).

The first case that Meniere was able to study, both clinically and pathologically, is too well known to be described again. The acute "Meniere's Symptoms," recorded clinically during life, in that case were associated with a reddish, plastic exudate, found after death, in the semi-circular canals, and partly in the vestibule. It was of the nature either of a rapid exudation of blood-stained serum or of a hemorrhage. There is no doubt that to coincide with the sudden onset of the clinical symptoms, the pathologic change must be a very rapid one; and this is consistent with a rapid exudation into the membranous labyrinth causing a sudden increase of intra-labyrinthine tension. Since Meniere's time a considerable number of post-mortem examinations have been made of fatal cases of leucocythemia (3), in which pronounced Meniere's Symptoms were present during life. In these, examination after death showed hemorrhages into the semicircular canals, vestibule and cochlea. If the one essential characteristic of true Meniere's Disease not supervening on a previous disease be labyrinthine apoplexy, then these are all undoubted cases of true Meniere's Disease; for the microscope clearly reveals the peri-lymphatic space between the membranous and osseous semicircular canals completely filled up with an effusion of blood, some of which has been organized into newly-formed bone. The scala tympani of the cochlea is also seen to be

filled with organized blood clot. The symptom of sudden vertigo is thus easily explained by a sudden escape of blood or serum into the labyrinth, which increases intra-labyrinthine tension by the extra amount of fluid pressed into the space that only holds a constant quantity of peri-lymph under normal circumstances. Excessive mechanical pressure thus induced, acting on the vestibular nerve-endings, produces an irritation which provokes the urgent consciousness of disordered equilibration. The symptoms of tinnitus (positive) and deafness (negative) are auditory phenomena, and are due to irritation and loss of function, respectively, of the cochlea branch of the auditory nerve. (This inference is borne out by those analogous cases of leucocythemia in which hemorrhage, or its organized results, are discoverable in the cochlea after death.) This "auditory" nerve travels to the nucleus accessorius, thence as auditory fibers along the striæ acousticæ, and, ascending in the lemniscus, passes upward to the cerebrum without the intermediation of the cerebellum, to which the equilibrial fibers eventually find their way. The other symptoms—viz., pallor, prostration, syncope, cold clammy sweat, nausea, and vomiting, are explained by a passing stimulation of the adjacent medullary centers (cardiac, vaso-motor and secretory), which lie in close anatomical relation with the nucleus of the eighth nerve. To explain the symptoms of faintness or syncope that may occur synchronously with vertigo, Dr. Woakes (4) has pointed out a line of direct communication between the heart and the labyrinth. While the sound-conducting apparatus is supplied by the external and internal carotids, the sound-receiving apparatus is supplied by quite a different blood supply—viz., the vertebral. On this artery a rich plexus of nerves, derived from the inferior cervical ganglion, finds its way to the labyrinth, and from this ganglion also proceeds one of the principal nerves controlling the heart's action. It is not therefore surprising that vertigo may induce faintness or syncope, or conversely that these may accompany a well-defined attack of Meniere's Symptoms.

How, secondly, do we explain pathologically the Meniere's Symptoms that occur in cases of Meniere's Disease (Class I., Division B), and those in Class II., of secondary labyrinthine irritation, that exhibit these symptoms.

It has seemed to me that these symptoms may be caused, in the first instance, not only by the mechanical causes to which

I have already referred—i. e., by an increased quantity of fluid, by its presence temporarily raising intra-labyrinthine pressure and thus stimulating the peripheral expansion of the equilibrial nerve to produce the consciousness of disturbed equilibration—but that the quality of the lymph may bring about the same result. Is it not reasonable to think that quantities, even of an infinitesimal amount, of toxic substances present in the endo- or peri-lymph may act in a chemical manner upon the exquisitely sensitive ampullar nerve-endings of the auditory nerve? Would not this account for the action of certain drugs—quinin, to-wit—which, in a toxic dose, will produce the trio of Meniere's Symptoms? Hitherto no good explanation appears to have been offered of the action of these drugs which, when administered in toxic doses, produce vertigo. Might not such an impurity account for gouty vertigo also? The gouty diathesis implies a toxic condition of the blood from either an excess in production of the toxic results of metabolism or from defective elimination and consequent accumulation in the system. Is it not likely that toxic material of one kind or another may enter the labyrinthine endo- and peri-lymph, which lies close to the labyrinthine blood vessels, and acting on the impressionable ampullar nerves, whose end-organs it continually bathes, warn the individual by the disconcerting sensation of vertigo of the presence of a danger needing immediate attention? To me this speculation appears most probable, and although I have unfortunately not the opportunity of proving the correctness of it,, it seems to me to be one well worth investigation, although on account of the small amount of endo- or peri-lymph at disposal for investigation and the probable lack of delicate enough analytical apparatus, a negative result of any such experiment could hardly be taken, at present, as disproof. To a dog a toxic dose of quinin sufficient in its case to cause definite vertigo might be given and then having been killed immediately traces of this alkaloid might be sought either in the endo-lymph or in the cerebro-spinal fluid, which is in direct communication with the peri-lymph of the labyrinth.

As regards the relation of the symptoms of Meniere's Disease to the pathologic condition of cases belonging to Class II, it has seemed to me that when one considers the minuteness of dimensions of the tympanum (some five lines from before backward, three lines in the vertical direction and between

two and three in the transverse), it is not difficult to conceive that if there be a chronic fetid discharge with obstructed egress from a partially blocked Eustachian tube and, maybe, a perforation in the tympanic membrane, perhaps small and highly placed doses of toxic material may under certain circumstances find their way into the labyrinthine lymph by permeating the thinned or eroded labyrinthine walls, or by penetrating an affected fenestral membrane and thus causing irritation of the vestibular end-organs and giving rise to well-marked Meniere's Symptoms. Would not this explain why Meniere's Symptoms so frequently occur in cases of otitis media?

Of extra-labyrinthine causes in the production of Meniere's Symptoms, affections of the tympanum may most frequently be held to account. Otitis media is by far the commonest cause of the malady, but any disorder or disease of the middle-ear producing pressure on the foramen ovale, and thus increasing intro-labyrinthine pressure, may give rise to its well-recognized trio of symptoms. Fixation of the stapes is answerable for a large majority of such cases. In a series of cases published by Burnett (5), the well-known American otologist, excellent results appear to have occurred in the case of retracted and ankylosed ossicles by, first, removng the malleus in order to liberate an impacted stapes; secondly, by removal of both incus and stapes; thirdly, by removing the stapes only, and, fourthly, by simply breaking off and taking away the long process of the incus. Burnett came to the conclusion that it is the best treatment to employ the last method, especially as it is followed by the least inflammatory reaction. By removing the long process of the incus, a severance of the retractive power of the incus from the stapes is brought about, intra-labyrinthine pressure is reduced, and the tympanic vertigo relieved. He thought that puncture of the foot-plate of the stapes would be justifiable for relief of intra-labyrinthine pressure, but I can find no recorded case of this having been attempted. Spasmodic contraction of the tensor tympani muscle, or paralysis of the stapedius by allowing the foot-plate of the stapes to sink into the oval opening, will also produce the vertigo of Meniere's Symptoms. Politzer (6) describes a case in which a bony growth on the external labyrinthine wall, that had grown over the foramen ovale and was united to the stapes, produced symptoms of true Meniere's Disease, and I have notes of a case of cholesteatomata in the tympanum

producing Meniere's Symptoms. Condition of the external auditory meatus in which there is lodged a tightly-fitting foreign body or a plug of cerumen, together with an impermeable Eustachian tube, will produce, according to atmospheric changes, a positive or negative pressure in the tympanum, and this will give rise sometimes to well defined Meniere's Symptoms, which are, of course, readily cured by the removal of the foreign body or cerumen and the opening of the Eustachian tube by the catheter and india-rubber air-bag. Moos (7) relates a case of Meniere's Symptoms that was sent to him, when he was in charge of the ear clinic, from the medical clinic, diagnosed as a case of Meniere's Disease. All the symptoms (vertigo, deafness, tinnitus and vomiting) disappeared on removal of a plug of wadding from the right ear. Another cause of secondary labyrinthine lesion (Class II.) is cerebro-spinal meningitis. In this disease an otitis labyrinthica is set up by direct communication from the cerebro-spinal fluid of the peri-lymph of the labyrinth. Gottstein cites two cases in children which were brought to his clinic suffering with deafness(tinnitus and staggering gait. He found there had been an outbreak of cerebro-spinal fever in the district from which they came, and although these individuals had not been under medical care, the time they were acutely ill was found to be coincident with that of the cerebro-spinal fever epidemic. Cohn of Breslau found evidences in the eyes of such a nature as to lead him to suppose, as the eyes and ears of these two patients had been affected at the same time, that they had both had cerebro-spinal meningitis.

The treatment of cases belonging to Class I. has not been at all successful up to the present. The drugs recommended, apart from the primary aperient and stomachics, are the bromides, quinin, potassium iodid, salicylates, arsenic, ammonium chlorid and gelsemium. If the symptoms are of syphilitic origin calomel and potassium iodid is the treatment *par excellence*. In other cases the bromides and quinin are undoubtedly by far the best drugs. Charcot was the first strongly to advocate quinin, and in a paper by Dr. E. Meniere (8) ["Causes et traitement du vertige de Meniere"] this author, who has taken special interest in the disease that was first described by his father, urges that, without neglecting other therapeutical means, quinin ought to be always prescribed, as it has often been successful. Dr. J. M. Bradley (9) com-

ments on the fact that although many recommend the use of quinin, no directions are given for its administration. He lays down rules for the treatment. He begins by finding out for the particular patient the minimum toxic dose of the drug, and taking this as a starting point, he increases the drug gradually until the patient begins to complain of an increase in the tinnitus. This limit is taken as the patient's maximum dose, and is the dose, he affirms, which will control the paroxysms of vertigo. As quinin is quickly eliminated from the body, being practically gone in twenty-four hours, he does not propose to keep the patient on the maximum dose, but gives it in such a way that the good effects of the maximum dose, without cinchonism, will be kept up without having to reduce it suddenly to the minimum dose on account of intolerance from toxic discomfort. In a case of true Meniere's Disease (10), published by myself at the beginning of last year, I gave excellent temporary relief of symptoms by the application of a seton in the nape of the neck; and Mr. Colin Campbell (11) published a case of Meniere's Symptoms in which similar treatment produced the happiest possible results. In my own case unfortunately I left the neighborhood before the treatment was established on a sound footing, namely, on April 25th, 1902, when the patient had been under my watchful care for over two years. On the following September 17th my successor wrote me: "—— had no fit after you saw him, resumed light work at the end of May and went back to his own work in the second week in June. On June 23d I removed the seton. On July 26th he had a severe attack of vertigo and three days later he had two severe attacks, with one of which he vomited. I introduced a fresh seton on July 30th, and since then he has had no severe fit, and laterly none at all; he has now resumed light work." To sum up—I introduced the seton on April 6th, and from April 10th to July 26th (a period of three and one-half months) there was no fit whatsoever. After the seton was removed, a thing I should never have done myself, had I been still treating the case (as six months is the minimum time for insetion), the attacks remained in abeyance for a month, and when a fresh seton was inserted on July 30th the attacks vanished again and did not return for another three months at least. Unfortunately, no accurate account was kept after my note of September 17th, but on the following March 10th I had word to say that the patient had been free from

attacks "for a time," and then had gone to work with the seton in *situ*, and had had a recurrence of the vertigo subsequently, when the seton was withdrawn. At this period, again, had the case been under my care, I should have imediately recalled him from his work and inserted, if necessary, a second seton. The reasons I have such full faith in the seton, after drugs have been found to be of no avail, are the following:

1. When a seton is placed at a spot not far emoved from the position of any lesion, the determination of blood to this new surgical site will tend to diminish the quantity of blood at the affected part.

2. I believe that it acts reflexly on the vaso-motor system by means of the sympathetic, so as to cause constriction of the vessels in the vicinity of the lesion.

3. The presence of a seton causes a definite physical effect by determining a constant and continuous "reminder" of its presence. Its presence, acting on the central nervous system, produces a transference of the consciousness of a trouble of one kind, in one part, to that of a different nature in another.

From personal observation I am quite assured of the fact that anyone suffering from "Meniere's Symptoms," unless possessed with an inordinate strength of will and character, will, after a time, become apprehensive of a dreaded attack taking place—nay, some, indeed, actually live in terror of their approach—and this very apprehension may produce a veritgo, which, though not due to the original cause, occurs from vaso-motor disturbances and simulates the primary attack itself. Just as some suffer from morbid blushings of the face, due to disturbances of the sympathetic system from emotional causes, so hyperemia of the labyrinthine vessels may be produced by fear and anticipation of a recuring paroxysm of vertigo. If such a treatment can be of practical use in true Meniere's Disease, it is a treatment I should unhesitatingly recommend for any case of Meniere's Symptoms that does not quickly and certainly respond to drug treatment.

Lumbar puncture is another method of treatment that has been recomended and tried for this disease of nerve-irritation. In a case attached to this paper I have added some remarks on the principles that underlie this method of treatment. I will, therefore, leave the case and its remarks to stand for themselves.

I have pleasure in being able to place before you a case of Meniere's Disease (Class II.) the new treatment of which—viz., hypnotic suggestion, has been eminently satisfactory. So far as I am aware, it is the first case in London treated in this way; and even in Paris, the home of hypnotism, one has not read of any cases that have been treated by this new method. The honor of recommending this treatment and carrying the case to a most successful issue is entirely due to Dr. A. Ernest Jones, of University College Hospital. It has been my privilege to witness the treatment of this case from the outset. The brilliant result, as will be seen from the full notes adjoined to this article, far exceeded our most sanguine expectations. The picture of the cure of a man of some forty-four years, who had become prematurely old from the constant worrying and depressing effects of eight years' unbearable tinnitus, vertigo and vomiting is vivid enough without further comment.

PRESENTATION OF CASES BEFORE THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, BOSTON, 1905.

Tympano-Mastoid Exenteration, Showing Healing of Cavity by Blood-clot, and Wound by Subcutaneous Silk Suture: Dr. Frank B. Sprague of Providence, R. I., showed this case. The patient was a boy of 19, who gave a history of chronic suppurative otitis media dating back fifteen years. Three weeks ago Dr. Sprague performed a radical mastoid operation after the Stacke-Zaufal method. The cavity was allowed to fill by a blood-clot up to the drainage tube, and the external mastoid wound was closed by subcutaneous silk sutures, so that now the scar was scarcely visible. An ordinary cigarette drain was inserted into the tympanum and allowed to come out through the opening of the canal, in which was placed a stiff rubber drainage tube, about half an inch in diameter, for the purpose of giving a good conformation to the canal, and an opening of sufficient size to insert the dressings. The tube was allowed to remain in about a week. At the present time, the whole canal was well formed, and new skin formation was well under way. The case was a good illustration of what the organized blood-clot could do in the repair of the mastoid wound in chronic cases, where radical operation was necessary.

This patient, Dr. Sprague said, prior to the operation had suffered from epileptic convulsions during the past seven years, the seizures coming on about twice weekly. Since the operation he had been entirely free from attacks, and it would be interesting to note whether it would have a permanent beneficial effect on the epilepsy.

A Case of Angio-Neurotic Edema: Presented by Dr. O. B. Douglas of Concord, N. H. The patient was a man, 41 years old, who recently came under the speaker's observation, complaining of a sudden swelling of his tongue. He stated that last Christmas he had had for the first time a similar experience. The swelling first involved one edge of the tongue, and gradually extended to the other, subsiding on the side first affected as it increased on the opposite side, and usually disappearing in the course of twelve hours.

He had also had similar manifestations involving the right arm, face, scrotum, etc., subsiding usually in twelve hours. There was never any pain nor rise of temperature, and usually no premonitions nor discoverable immediate cause. The patient was an habitual drinker of Bass' ale, and occasionally of whiskey. His appetite was usually good; his bowels were regular.

The case was interesting, Dr. Douglas said, on account of the possible occurrence of edema of the glottis during one of these attacks. Osler had reported a number of similar cases, in two of which death occurred from acute edema of the glottis.

DISCUSSION.

Dr. Wolff Freudenthal of New York said that from the history given by Dr. Douglas, he was inclined to regard the case as one of urticaria or giant urticaria. He had observed a number of such cases, and in one that he reported about fifteen years ago the larynx was affected. The usual history obtained from these patients was that the attacks followed some indiscretion in diet, and that fact should not be lost sight of in the treatment of these cases.

Dr. Thomas H. Halsted of Syracuse, N. Y., said he agreed with Dr. Freudenthal that Dr. Douglas' case apparently belonged to one of the varities of urticaria, and was closely allied to anglo-neurotic edema. In three such cases that had come under his observation, two developed edema of the glottis.

Dr. Halsted said that one of the most important features in connection with this condition was the possibility of its following the use of diphtheria antitoxin. It was well known that this remedy frequently gave rise to various types and degrees of urticaria and of angio-neurotic edema, and the possibility of its causing edema of the glottis, which might be mistaken for the presence of diphtheritic membrane in the larynx, should not be overlooked.

Dr. Charles W. Richardson of Washington, D. C., said he thought the case shown by Dr. Douglas was one of angio-neurotic edema, and when it affected the larynx there was usually a great deal of infiltration of the tissues of the neck. In many of the cases there was a marked hereditary taint, and in one case that came under the speaker's observation the condition could be traced back through three generations. The father had had three attacks in which there was marked edema

of the pharynx and larynx, with threatened suffocation, and the son had two similar but less severe attacks. One peculiarity of the hereditary factor in these cases was that the male members of the family were more prone to be affected than the female. The condition was often associated with errors in diet. It usally subsided very quickly upon purgation and free incision.

Dr. William L. Ballenger of Chicago, Ill., said that about eight years ago he reported a case of angio-neurotic edema which was apparently similar to the one shown by Dr. Douglas. The patient was a young woman of 23, who was on her way to the theatre. While on the train she developed a severe headache. and after traveling about five miles she had an attack of suffocation. She left the train at the next station and was brought to Dr. Ballenger's residence. When he saw her, she was suffering from acute dyspnea, and upon examination he found the uvula, the lateral wall of the pharynx and also the glottis somewhat edematous. In addition to that, both sides of the nose were edematous and much infiltrated, and the patient was in an extremely nervous state of mind. Under the use of astringent applications, the condition practically disappeared at the end of twenty-four hours.

In this case there was no history of any other member of the family ever having been similarly affected. The young woman was a teacher; she was of a neurotic temperament, and had considerable digestive disturbance. There had never been a recurrence.

Dr. J. A. Stucky of Lexington, Ky., asked if there was any history of rheumatism in Dr. Douglas' case. He was inclined to believe that these manifestations were associated with the acute lithemic condition.

Dr. Lewis A. Coffin of New York inquired as to the condition of the stomach and bowels in Dr. Douglas' case, and said that while the causes of these manifestations were numerous, he thought that in the majority of cases the condition was due to gastro-intestinal trouble. In one case under his observation, a woman, the immediate symptoms were quickly relieved by sedatives, and this, followed by lavage of the stomach and bowels, gave relief for some time; in fact, until another attack was brought on by some indiscretion in diet.

Dr. James E. Logan of Kansas City, Mo., said he had noticed that many of these patients partook liberally of cheese, especially in the form of Welsh rarebits.

Dr. John F. Culp of Harrisburg, Pa., mentioned the case of a woman who developed this condition every time she indulged in eating nuts, and her last attack was produced by eating a small quantity of nut candy. The tongue and palate became very much swollen, and suffocation seemed so imminent that preparations were made to do a tracheotomy. Under applications of cocain solution, however, and the use of ice, she became comparatively comfortable in a few hours. This patient, Dr. Culp said, had long suffered from chronic indigestion, and had some trouble with her bowels.

Dr. Harry L. Myers of Norfolk, Va., mentioned a case in which the edema involved the eyes. This patient gave a distinct history of rheumatism and asthma. In another case the larynx was much affected. The treatment that seemed most efficacious in the cases he had seen was large doses of benzoate of soda and injections of pilocarpin.

Dr. O. B. Douglas, in closing, said that during the patient's first attack adrenalin chlorid was applied, and apparently had some good effect. It was tried again in the second attack with no effect whatever. Appreciating that the condition was neurotic in character, he administered whiffs of chloroform until the patient became unconscious, when for the first time the swelling remained stationary. It did not, however, immediately begin to subside.

In reply to various questions, Dr. Douglas said that this man gave no history of rheumatism; he had never been poisoned by ivy or sumach; he was not constipated and had never complained of any stomach symptoms.

Dr. Douglas said that in another case that came under his care recently the edema of the larynx was relieved by spraying with adrenalin chlorid solution, and recovery was very prompt. That patient was a woman.

PRESENTATION OF INSTRUMENTS BEFORE THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, BOSTON, 1905.

Dr. Chevalier Jackson of Pittsburg, Pa., exhibited a number of new instruments, including a *bronchoscope,* an *esophagoscope,* a *tracheoscope,* a *laryngo-pharyngeal speculum,* and a long forceps, and gave a practical demonstration of their use.

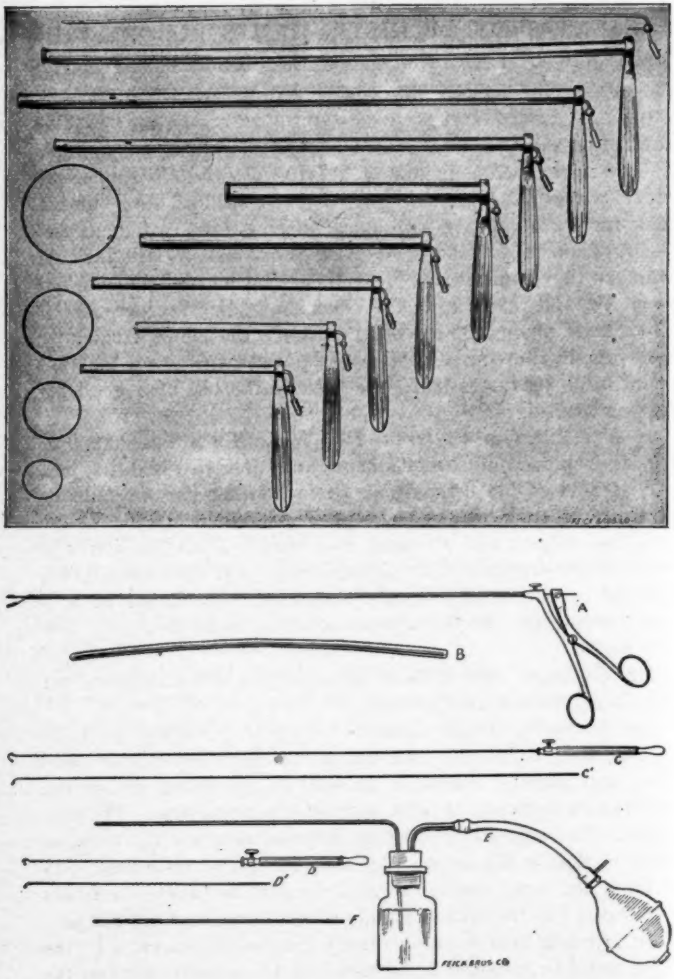
Dr. Thomas J. Harris of New York asked Dr. Jackson whether the lamps in the instruments he had shown worked properly. He had heard the criticism made that because of deposits of mucus, or for other reasons, the lamps frequently went out in the course of the manipulations, and on that account some operators had gone back to the use of a good reflecting head-light.

A New Septum Cutter: Dr. William L. Ballenger of Chicago showed this instrument, and demonstrated its use. It was devised for the purpose of facilitating the sub-mucous window-resection of the nasal septum. The mucous membrane was first incised and elevated, and then a small incision was made in the septum. The septum cutter was then introduced, and the operation was rapidly completed. By means of it, a window-resection of the septum could be done in a very few minutes.

Dr. Ballenger also showed an improved tonsillar snare for the partial removal of the tonsil.

An Improved Head Lamp: Dr. J. A. Stucky, of Lexington, Ky., said that one great desideratum in the nasal sinus and mastoid operation, as well as operations within the pharynx, was plenty of light without too much heat. He considered the lamp he showed an improvement on the Jackson lamp in that it did away, (1) with the metal reflection; (2) it fitted the head comfortably, and could be worn for hours with ease; (3) the sixteen candle power lamp used did not produce as much heat as the ordinary ten candle power; (4) the lamp could be removed or adjusted by an assistant without the operator touching it.

A New Septotome: Dr. Walter A. Wells, of Washing-



DR. JACKSON'S INSTRUMENTS.

ton, D. C., showed this instrument, the purpose of which was to cut out of the cartilaginous portion of the septum a tongue-shaped flap, and to accomplish with a single incision at least as much as was done in the Asch operation with two separate incisions. This overcame the necessity of removing one set of scissors to substitute another, which might prove a serious drawback in case one was operating upon a nervous patient under a local anesthetic.

In the Asch operation, the result of the incisions was to create four small triangular segments, with their points in apposition, which meant that we had four possible points of sloughing. With the instrument shown by Dr. Wells, but a single flap was cut, and this having what many rhinologists considered the ideal shape for this operation, the chances for sloughing should be decidedly lessened.

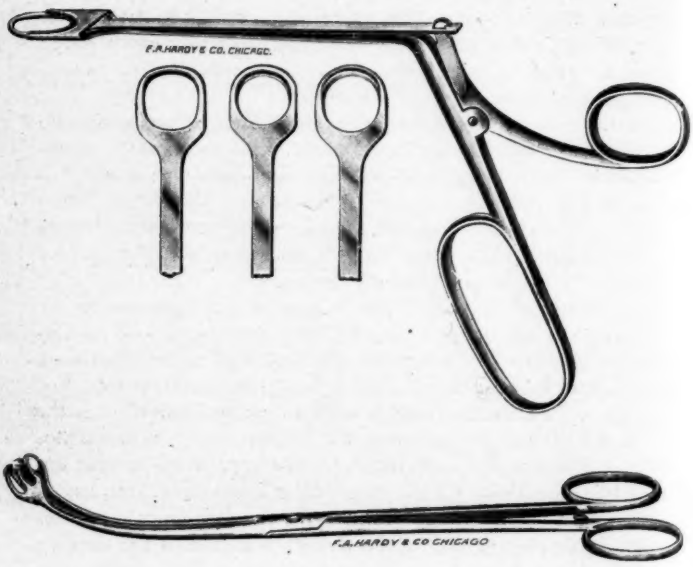
By means of a screw, the tongue-shaped flap might be shortened to any desired length. The instrument was so constructed that the flap, when cut, was bent well to the other side, thus converting the two stages of the Asch operation into one. Moreover, he thought a decided advantage was gained over the Asch instrument as regarded the introduction of the septotome. There was, in the latter, no sharp point to become engaged in the tissues as it was being introduced. It had a large and a small jaw, the former for the free side; the latter for the side obstructed. Even though one side of the nose be completely obstructed, the shape and size of the smaller jaw was such that it might be wedged in without any laceration of the tissues.

The object of the flat band of steel, which was attached to the larger jaw of the instrument, was that it would act as a spring, and force back into the median line the flap that had been cut out of the septum, a very important provision to prevent its being caught by the instrument as it was being withdrawn.

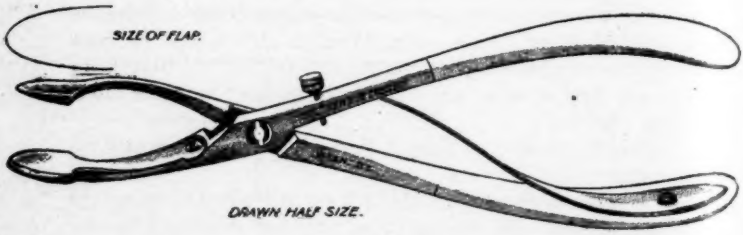
Modified Head Lamp: Dr. Wendell C. Phillips of New York showed this lamp at the request of Dr. H. Bert Ellis. It was a Nernst light, and could only be used with the alternating current.

Dr. H. P. Mosher of Boston showed the following new instruments:

1. A *wire cheek and lip retractor* for use when entering the antrum through the canine fossa, and for dressings by the same route after the operation. The retractor was made of wire



DR. BALLENGER'S TONSIL INSTRUMENTS.



DR. WELLS' SEPTOTOME.

and thus was lighter than the ordinary retractor made for that purpose. It had its three prongs so bent that the canine fossa was widely exposed. One end of the retractor was made for the right cheek, and the other for the left. The retractor could be used in order to expose the teeth and gums of both jaws in the ordinary routine of the first examination of a patient.

2. A *safety pin closer* for use in the esophagus and the trachea. This device was originated for the case of a patient with an open safety pin, point up, in the esophagus. The essential part of the safety pin closer was a ring placed at right angles to the end of a long wire handle. The size of the ring was such that it could pass a large esophageal tube, while the handle was of a sufficient length to allow the ring to pro-

DR. STUCKY'S HEAD LAMP.

ject well beyond the end of the tube. A forked wire was used with the ring in order to engage the knee of the pin and push it through the ring. As this was done, the point of the pin was disengaged from the mucous membrane and the pin closed. The safety pin closer could be improvised very easily for any length and size of tube, and for any sized pin. A set of esophageal instruments should have two or three rings of different sizes. By bending the ring upward, so that it was more or less parallel with its long handle, it made a good penny catcher, and by bending the handle somewhat an inch or two above the ring, the ring could be made to hug and explore the front wall, the posterior wall or either side of the esophagus at will.

3. A *nasal splint.* This splint was devised in order to treat

a case of fracture of the orbital rim of the superior maxilla combined with a fracture dislocation of the nasal process of the same bone. The upper end of the nasal process of the right side projected very markedly outward and caused great deformity. The deformity was readily reduced, but the usual bandages and splints would not hold the fracture in the corrected position. The base ball mask splint was then made. It held the fracture easily, and the result was excellent. The advantages of the new splint were its steadiness and its power.

The splint consisted of an ordinary base ball mask, with two set screws. These could be adjusted laterally and vertically, so that pressure could be applied at any given point on either side of the nose. Owing to the support which the splint obtained from the forehead, the chin and the sides of the face by the pads placed at those points, the mask could be bound firmly to the head and face, so that it could not slip. The wires of the mask gave such a fixed point of departure for the application of the force of the set screws that as little or as much pressure as was desired could be used. In this way, the splint could be employed either as a retaining apparatus for a fracture, or as a correcting apparatus after operations for old fractures of the nose, with lateral deformity. With such a splint it would be possible to do a certain amount of orthopedic work, so to speak, on the nose.

After the pressure of the screws was no longer necessary, the screws could be removed and the mask worn alone for a time as a safeguard against any accidential trauma. In the case where the splint was first used, the child wore the mask in this way for a few days. This allowed the parents to leave her at night without anxiety.

EXHIBITION OF SPECIMENS BEFORE THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, BOSTON, 1905.

Epithelioma of the Larynx: Dr. Chevalier Jackson showed this specimen, which was one of squamous-celled epithelioma of the larynx, and was removed post-mortem from a patient who had been under the care of Dr. E. S. Montgomery, of Pittsburg. Laryngectomy had been refused by the patient.

Epithelioma of the Antrum: Dr. Jackson also showed this specimen, which was removed from a man about sixty. The entire upper maxilla was involved in the epitheliomatous process, and was removed. The patient lived for two years after the operation without a recurrence. The preliminary ligation of the external carotid rendered the operation practically bloodless, and thus a tracheotomy was unnecessary.

Epithelioma of the Larynx: Dr. Jackson also exhibited this specimen, which was one of laryngeal epithelioma perforating the thyroid cartilage. It was removed by total layrngectomy, taking out the glands at a subsequent operation. There was a fatal recurrence at the end of four months.

Killian's Inspection of the Trachea and Esophagus: Dr. H. P. Mosher of Boston demonstrated this on the dead in a sitting position, as was usually done. Dr. Mosher said that a much better view of the parts could be obtained by placing the patient on his back, with the head hanging down over the edge of the table. If Killian's method failed after a short trial, he advised doing a tracheotomy, and then inserting a pair of bent forceps and seizing the foreign body under the guidance of a Kelly cytoscope.

In the removal of foreign bodies from the esophagus, Dr. Mosher said he did not favor the use of the old-fashioned probang.

ABSTRACTS FROM CURRENT OTOLOGIC, RHINOLOGIC AND LARYNGOLOGIC LITERATURE.

I.—EAR.

Removal of the Semicircular Canals in a Case of Unilateral Aural Vertigo.

RICHARD LAKE (*The Lancet,* June 4, 1904) reports the case of a woman, aged 21 years, who had been the subject of attacks of aural vertigo, combined with sickness and vomiting, with gradually increasing deafness and tinnitus, the whole duration of the disease being five years. No cause could be found for the origin of the deafness. During this period she had been subjected to long courses of treatment, both by careful dieting and by the administration of various drugs of repute for the relief of these symptoms. She was first seen six months before the operation about to be described was performed. As she stated that she thought the use of her eyes in reading and in needlework tended to induce the attacks, she was examined at St. Thomas's Hospital by Mr. J. H. Fisher, who diagnosed slight hyperopic astigmatism, and ordered her appropriate glasses, which she wore until a fortnight before the operation. She, however, stated that the use of these glasses made no difference as to the frequency of her attacks. The attacks were heralded in usually by increased tinnitus, which not infrequently came on while she was lying down. The tinnitus persisted after the sickness and vertigo had ceased. She was unable to state that objects took any particular course during the attacks or that she felt any tendency to fall in any particular direction.

During the six months in which she may be considered to have been under treatment she was for some time given a dram of quinin daily in three doses, each dose being administered with a dram of hydrobromic acid. She also took iodid, strychnin, belladonna and mercury, yet during this time not only did she obtain no relief, but her attacks increased in frequency, often recurring after an interval of only one day, though for the last two years and more she had never been free from an attack for a period of more than two months. As a last final attempt to obtain relief before having to resort to an operation, which at the best could only be based on theory, she was taken into hospital and treated with hypodermic injec-

tions of pilocarpine. During these two weeks she had several atacks of vertigo. The examination of the ear gave the following results; Acoumeter in concha. The voice was heard at two feet; a whisper was not heard. Rinne's test with tuning forks C and C^2 gave negative results; C. mastoid, —30 seconds. On testing with tuning forks C and lower notes were not heard. C^1 was heard at 50 seconds; C^2 at 40 seconds; C^3 at 30 seconds, and C^4 2048 at 25 seconds.

On Februay 16th, 1904, she was anesthetised and an ordinary radical mastoid operation was performed, with the exception that the innermost portion of the posterior wall was not removed, but the bony opening in the temporal bone was enlarged, forwards, upwards and backwards. Anteriorily it was extended into the base of the zygomatic process of the temporal bone and postero-superiorly in such a way that the long diameter of the bony wound was from above downwards and forwards. The malleus and incus lying exposed after the removal of the external attic wall were removed. At this period of the operation the burr was substituted for the cutting gouge which had been previously employed. The next step in the operation consisted in exposing the upper and outer surfaces of the external semi-circular canal in its whole extent. The antero-external portion of this canal was now followed forwards and inwards until the outer surface of the superior canal was brought into view. The whole of this canal was then removed by cutting it away with a medium-sized burr, leaving only the upper part of the arch or fornix untouched. The posterior rim of the external canal was then followed so as to bring into view the posterior canal, which was burred away entirely. A large ovai burr was now substituted for the medium-sized one previously used and the upper surface of the external—the only remaining canal—was cut away with the burr until the anterior half of the membranous canal was exposed. This was then removed with a small burr, which was afterwards employed to make a medium-sized opening into the vestibule and an attempt was made to clean away the crista acustica at that end of the canal. The wound was then swabbed out with Lister's strong solution, a precaution which was considered to be necessary to adopt on account of the impossibility of carrying out our operative procedures under strict antiseptic precautions. The external meatus was divided longitudinally through

its posterior wall and the wound was packed and closed by the ordinary methods.

Immediately after the operation the patient suffered very severely from shock, which lasted for about an hour. Slight chloroform sickness supervened, but this was certainly hardly so much as is commonly the case. For the next 48 hours she lay coiled up on the right side, her thighs flexed on the abdomen and the legs on the thighs, in a position commonly described as that typical of cerebral irritation. During this period her eyes were tightly closed, but beneath the lids one could see that there were erratic movements of the eyeballs, and she resented any attempt to raise the lids, but though the light from the window fell directly on her face, she preferred not to have the window darkened. On the third day the wound was dressed and she would open her eyes if asked to do so, but preferred to keep them shut. When they were opened the eyeballs were subject to irregular rhythmical movements both upwards and downwards and laterally. On the seventh day she sat up; on the tenth day she was able to walk with assistance for a few steps, and on the fourteenth day she could walk easily from the small room in which she was into that adjoining, a matter of some 15 or 20 yards there and back. She could, however, only turn to the right or sound side. If she turned to the left she would have fallen over towards the right side. On the sixteenth day she walked downstairs with a little assistance and upstairs without any help. Her symptoms from that time lessened day by day. At the end of four weeks she was able to do everything without any fear of falling. Since the fourth day there had been no movement of the eyes, nor could any optic movements be induced by syringing the wound either with hot or cold lotions. It is now 14 weeks, or slightly over three months, since the operation. There has been no return of vertigo and the patient is enjoying better health than she has done for the last few years.

There are a few points in respect to this case which are worth considering. The first is naturally the indication for operation. That can only be arrived at with anything approaching certainty when one has more than a single case to consider. Those cases which would appear to me to be the most suitable are those in which, by a careful examination and after a course of treatment, one has proved that the vertigo cannot be controlled, and at the same time that the deafness is

sufficiently great to admit of no reasonable hope of alleviation, although, as will be seen when one comes to consider the question of tinnitus, the hearing does not appear to be diminished materially, and, indeed, the revese was noticed in this case.

The operation itself is one in which the difficulties will be largely due to anatomical irregularities and to the age of the patient. In those skulls in which the middle fossa is at a lower level than the semi-circular canals the operation would of necessity be more difficult and tedious. As to age, all patients excepting those who have passed middle age have a dense petrous bone, and the definition of the canals is extremely difficult. With regard to the symptoms following operation, it is impossible to avoid the conclusion that the extreme shock and irregular movements of the eyes were not entirely disconnected with the use of Lister's strong solution, for we are aware that irritation of the canals causes greater movement than simple section, and strong and irritant antiseptics should not be employed. Finally, with regard to the tinnitus and the hearing power. The former was absolutely uninfluenced by the operation; that is to say her tinnitus is as bad as it was before. The hearing power, however, underwent a most extraordinary change. The voice, which had only been heard before the operation at a distance of two feet, was now well heard at five feet. Her bone conduction, which had previously been—30 seconds, was now—25 seconds, but whereas she had heard the C^1 tuning fork, although very badly, before she was unable to detect it by air conduction afterwards.

Wyatt Wingrave.

Local Anesthesia in Major and Minor Operations on the Ear, as Observed in Professor Politzer's Clinic in Vienna.

GEORGE P. MARQUIS and OSCAR H. KRAFT, Chicago, (*Journal A. M. A.*, April 22, 1905). Preparatory to an operation the patient was given a meal, as experience has shown that after a meal cocain is much less toxic. The patient is prepared as for any surgical procedure. The following three solutions are previously made:

(a) One per cent solution of eucain in distilled water with five drops tonogen to each c. c. (Tonogen is an Autrian preparation corresponding approximately to adrenalin.)

(b) One per cent solution of cocain in distilled water with five drops tonogen to each c. c.

(c) Solution of cocain, 20 per cent.

The operator first fills the syringe with the eucain-tonogen solution and places it in hot water until it is warmed to the temperature of 40 to 50° C. An assistant takes the place of an anesthetizer and watches the pulse, pupils and general condition of the patient.

The needle is inserted over the mastoid process, about midway of a line running vertically and at about the middle of the mastoid process, and forced upward through the tissues until it reaches the bone, when one c. c. of the eucain solution is injected beneath the periosteum. The syringe is now refilled, the needle inserted through the same opening, the direction being downward and the point carried in the region of the apex of the mastoid where 1 c. c. of the solution is injected beneath the periosteum. The syringe is again filled with the same quantity, but directed inward and somewhat backward. The external ear is now drawn forward and 1 c. c. of the solution injected between the anterior wall of the mastoid process and the cartilage of the ear.

A speculum is next inserted in the ear and 1 c. c. of the cocain solution injected into the superior wall of the ear at the point of junction of the bony and cartilaginous portions. Another syringeful is injected into the inferior wall and a half-syringeful each into the anterior and posterior walls. Injections must be made beneath the periosteum and in such a way that a protrusion of the wall can be seen following them. This protrusion soon disappears.

A small pledget of cotton is now saturated with the 20 per cent cocain solution and inserted into the tympanic cavity through the perforation in the tympanic membrane. The pledget is not removed until the antrum is opened in the regular course of the operation.

The parts are next covered with bichlorid dressing, which remains in place until the operation is begun. All in all, not more than four or five centigrams of eucain and three centigrams of cocain are used, combined with the adrenalin solution. Cocain is used for the injection of the auditory canal as its action persists longer than the eucain.

The symptoms following the injection are never alarming. In fifteen to twenty minutes the anesthesia and anemia for the radical operation are complete, and one can begin as in any radical mastoid operation. Only small pieces of bone can be removed at a time, and the chisel should be held as flat

as possible, thus avoiding concussion. The patient feels that something is being done, but has no symptom of positive pain with the single exception that the initial cut through the skin is sometimes felt. The reporters are convinced that with the exception of children and hysterical subjects nearly every patient can be operated on by this method, and that in a great majority of cases a general narcosis can be dispensed with.

This method can also be used in acute mastoiditis with the same technique, with the exception that concerning the posterior auricular region it is not necessary to inject cocain into the auditory canal. When there is subperiosteal abscess this interferes with the absorption of the solution.

For minor intra-tympanic operations they have found the method useful, such as for the extraction of polyps, granulations, endotympanal pseudoligaments, and even resection of the lateral wall of the attic. Ossiculectomy can also be done in the same way. The reporters have done intra-tympanic operations a number of times, with removal of the malleus and incus, on children without any pain and without the least sign of toxic symptoms.

The technique of the intra-tympanic operation is as follows:

"The ear is cleansed with deodorized benzine and washed with hydrogen peroxid or lysol solution. The syringe is then filled with the 1 per cent cocain-tonogen solution and warmed to 45° C. The speculum is now introduced in the ear and the needle inserted into the superior wall at the junction of the bony and cartilaginous portions. The needle is forced in until it reaches the bone, when a few drops are forced out of the syringe. The needle is then pressed cautiously forward and more of the fluid injected beneath the periosteum. In this procedure care must be taken that the needle is not forced through the cutis, or the fluid will escape into the auditory canal. Should this occur, the injection must be repeated two or three times until the covering of the superior wall bulges downward, showing that sufficient fluid is retained.

The syringe is cautiously withdrawn and a small pledget of cotton saturated with tonogen is pressed against the field of operation. After waiting from ten to fifteen minutes to allow the anesthetic to take effect, the operation can be performed without the slightest inconvenience to the patient.

On the completion of the operation the field is dusted with a mixture of equal parts of anesthesin and boracic acid to

counteract the severe pain which would otherwise develop in an hour or two following the operation. This indication is fully met by this powder, as in the cases where it has been used the patients have not complained of any pain subsequent to the operation.

The syringe used for these injections is of metal, holding 1 c. c.; and with a needle modified by Neumann. A pair of half rings (which are detachable) have been added to the syringe to facilitate the injection." *Richards.*

Two Cases of Lateral and Sigmoid Sinus Thrombosis, One with Jugular Exsection, Recovery Notwithstanding Meningeal Symptoms.

CHEVALIER JACKSON, Pittsburg, Pa. (*St. Louis Medical Review,* March 25, 1905). The first case was a child of nine years with no ear symptoms other than otorrhea one month prior to operation, when the attending physician was called to see the child in convulsions following vertigo, although there had been a chronic otorrhea from the left ear since typhoid fever, four years' previously.

There had been no chills, sweats or temperature exacerbations. The mastoid cortex was not perforated, but as soon as chiseled through foul pus was found in every direction. The inner table was eroded away over the vertical portion of the sigmoid sinus, the gap being crowded full of black, gangrenous-looking granulations, of foul odor, springing from the dura, which was dark crimson and fading to normal only when the sinus had been uncovered back to the torcular. After thorough cleansing of all the granulations and removal of soft bone the sinus was found soft and boggy at the knee and very firm, almost cordlike, below that point. The sinus was split open by an incision 3 c. m. in length. Firm, organized clot was found to have occluded the lower sigmoid and the jugular bulb, which seemed firm and healthy and was not disturbed. The lateral sinus was slit up backward until the curette could reach the torcular, and free bleeding followed. The sinus was packed with iodoform gauze.

The patient's condition was so very bad that it seemed unwise to exsect the jugular.

Except for marked amnesic aphasia, the after treatment was uneventful. Even this subsided at the end of a week. The wound healed quickly and recovery was complete.

While the writer obtained prompt and perfect recovery from septic sinus thrombosis after drainage, without jugular exsection, due to organization of the clot in the jugular bulb, he regards this as a very unsafe precedent to follow.

Case second was a man of 19 years, who had suffered with frequent earaches during childhood and otorrhea for intervals for three or four years past. The present illness began six weeks previous. He complained of pus from the left ear ten days before operation, nine days later dizziness, epileptiform seizures, nausea, vomiting and mastoid tenderness, for which the mastoid was opened and all pus and dead bone removed. The case did well for a week, when the symptoms again set in with greater violence, and it was found that some bone had died in every direction since the previous operation.

Second operation was done. Extensive area of dura bathed in the pus of an extradural abscess was exposed with accompanying area of pachymeningitis.

While the sinus contents appeared to be fluid on palpation, exploration was deemed warranted, and an incision 2 c. m. long, made from the knee downward, evacuated pus, fluid, lumpy and cheesy. In the direction of the jugular bulb the clot was broken down and foul. The internal jugular vein was then exsected through an incision in the neck below the auricle to the clavicle, all the branches being tied off. The sinus down to the bulb was safely curetted clean of pus and cheesy debris, and the other end of the sinus slit up far enough to allow the curette to reach to the torcular. The sinus was obliterated with iodoform gauze.

The after treatment was uneventful and recovery was complete in two months.

Microscopic examination of the exsected portion of the jugular vein showed the inner suface of the intima to be swarming with streptococci.

An interesting feature about this case was that the temperature was normal prior to operation. The writer regards exploration and the jugular exsection as harmless, provided the patient's condition be fairly good and not too profoundly poisoned with toxines.

The third case is reported as one with all the apparent symptoms of sinus trouble, in which, owing to the moribund condition of the patient, operation was not done, but in which the post-mortem showed the mastoid breaking down in pus, but the sinus to be absolutely normal.

Contrasting the normal sinus and absolutely typical sinus temperature with Case II., in which there was a sinus full of pus with absolutely normal temperature, the writer admits that all the diagnosis of which we are at present capable is as to whether exploration is justifiable or not. *Richards.*

Report of Two Fatal Cases of Brain Abscess.

EDWARD B. DENCH, New York City (*The American Journal of the Medical Sciences,* August, 1905). Case I., aged 52 years, presented the history of an acute middle ear inflammation with probable involvement of the mastoid at the time of the acute inflammation, but with apparent subsidence of all mastoid symptoms for a period of two weeks. He then came under observation with ill-defined cerebral symptoms, but with no evidences either of severe middle ear inflammation or of mastoid involvement. After four days' observation operation on the mastoid was performed as an exploratory measure, as there seemed to be no other reason for the irregular temperature elevation and a leukocytosis of 21,400. Rather extensive destruction was found in the mastoid, some free pus being present and granulation tissue. Increasing mental dullness led the author to do an exploratory craniotomy, the opening being made 1¼ inch above and 1¼ inch behind the center of the external auditory meatus, and an incision forward, downward and inward, extending to a depth of about an inch and a half into the brain substance, evacuated about an ounce of pus. The cavity was packed with sterile gauze, being previously examined through the encephaloscope.

Improvement lasted for four days, when the patient became dull, was aroused with difficulty. The abscess was dressed daily. From the fourth day until the ninth he became steadily worse, the temperature gradually rose, and he died on the tenth day after the operation with symptoms of meningitis.

Case II. A young man, aged 21 years, who was operated upon for a constant purulent discharge from the left ear, lasting for two years. After the ordinary conchal flap was cut, the posterior wound was packed with gauze and allowed to remain. Secondary skin grafting was done two weeks later, the granulations which had sprung up in the bony cavity being removed. Two large Thiersch grafts were applied to line the cavity, and the posterior wound completely closed by sutures. The temperature began to rise very soon after graft-

ing, and three days later the pledgets were removed and the grafts taken away. Four days after the temperature reached 105.6 and the wound was found to be infected. All stitches were removed and the wound irrigated freely with peroxide of hydrogen. At the time of the high temperature the blood count showed 25,000 white cells, 6,000,000 red cells, 81.5 per cent. polynuclear cells. Eye-grounds negative. Two weeks later, however, there was decided choking of the left optic disk, the patient was somewhat aphasic. The temporo-sphenoidal lobe was then explored by exploratory craniotomy and a large portion of the squamous bone removed. The dural flap was resected upward and several punctures made in the brain with negative results. Five days after the operation a small abscess formed under the anterior angle in the soft parts. Ten days thereafter, on opening the hernia cerebri, which was quite prominent, considerable pus was evacuated from the brain substance. These were packed with sterile gauze.

For the next six weeks there was steady improvement, with some slight temperature remissions, once reaching 104. Favorable symptoms continued until March 18 (the patient was originally admitted on December 5), when he complained of severe pain in the head, had a chill, became comatose, temperature rose to 105.8, neck became rigid and he presented all the evidences of meningitis. The brain substance was again opened over the region of the hernia cerebri and a considerable quanitty of turbid fluid evacuated. This fluid evidently came from the lateral ventricle. Temperature fell to normal, but soon rose again. Death occurred on the seventh day after the invasion of the ventricle.

In commenting on these cases the author makes the point that in suspected brain abscess the opening into the cranial cavity should be made as nearly over the site of the collection of pus as possible so that the abscess may be drained through a minimum amount of healthy brain tissue. He thinks that a more exact knowledge of craniocerebral topography, with a closer study of the symptoms in each individual case, will enable us to more closely locate the situation of the abscess in the brain substance and materially improve our statistics.

Richards.

Conservative Treatment of Protracted Cases of Acute Otitis Media Purulenta, with Its Complications.

ALFRED WIENER (*New York Medical Record,* April 8, 1905) reports a number of cases with symptoms suggestive of the need of mastoid operation, which nevertheless got well under conservative treatment. He does not allow himself to be influenced by either the etiology or bacteriological findings, so far as operative procedures are concerned. While the presence of streptococcus undoubtedly means a severe infection, it does not necessarily mean immediate operation. Rigid cleansing, drainage and constitutional support are first demanded. Because a patient has been suffering from acute otitis media purulenta for two weeks and suddenly develops a temperature of 104 degrees, with mastoid symptoms and the presence of streptococcus, this alone would not persuade him to at once adopt radical measures. He would first of all employ conservative treatment, and if, within thirty-six hours, there was no decided improvement, he would then operate. In simple and acute cases with mastoid complications he prefers to wait from four to six days before advising operative interference.

He makes a very free incision of the drum membrane with a sickle-shaped knife and then inflates the ear forcibly with the Politzer method, and if this is unsatisfactory, uses either a Siegle speculum or a Delstanche instrument. As a drain, and at the same time to exert a beneficial influence upon the edema of the middle ear, he puts a strip of iodoform gauze wet in 10 per cent. Burrow solution, and over the entire ear and surrounding parts an occlusive wet dressing of the same solution. In rheumatic cases salol, iron and cod liver oil are used.

He does not claim that this treatment is so ideal that every case will respond to it, but thinks that we should hesitate before advising radical operative procedures until we have convinced ourselves that the symptoms present are urgent enough to warrant such interference.

The reviewer thinks that most otologists, in the presence of symptoms such as those described in the six cases reported, would feel safer in doing the regular mastoid operation than in trusting to more conservative treatment. *Richards.*

Orbital and Meningeal Infection from the Ethmoid Cells—Death—Report of a Case.

JAMES F. MCCAW, Watertown, N. Y., (*The American Journal of the Medical Sciences,* August, 1905). The patient was a man forty years of age, who had been troubled with "catarrh" for ten years. The present illness began with what was supposed to be a head-cold, with swelling and edema at the upper and inner part of the left orbit, which quickly spread, involving both lids, conjunctiva and left side of nose, with great infiltration of the lids and orbital tissues. The temperature for a week ran from 100 to 103 with mental hebetude and mild stupor. When seen by the author there was a slight amount of swelling of the upper lid and chemosis of the conjunctiva of the left eye, sluggish reaction to light of the pupil, and on a line with and about an inch posterior to the external angular process of the temporal bone there was a smooth, rounded tumor about one and a half inch in diameter. Both nostrils contained polypi in the middle meatus, bathed in pus. The dead bone could not be detected in either nostril by the probe. Diagnosis of an intracranial involvement following an acute exacerbation of a chronic suppurative ethmoiditis, and the patient taken to the hospital, where an incision was made over the temporal region, and the subperiosteal collection of about two ounces of pus evacuated. The patient at this time was in a stupor with muttering delirium, subsultus tendinum, high temperature and pulse, involuntary urination, Cheyne-Stokes respiration, and death followed twenty-four hours later. After death the path of infection was found to have originated in the ethmoid cells, broken through the os planum, stripping the periosteum from the roof of the orbit, extending outward and downward to the external angular process of the temporal bone, and there passed out to form the subperiosteal collection of pus referred to. The orbital roof could be followed as far as the sphenoidal fissure, through which the infection probably entered the cranial cavity, apparently remaining subperiosteal throughout.

While fatal cases from suppurative sinusitis are rare, they are nevertheless to be considered as a possibility.

Richards.

Two Cases of Objective Aural Tinnitus Due to the Action of Tubo-Palatal Muscles.

WALTER A. WELLS, Washington, D. C. (*Journal American Medical Association*, January 21, 1905). Two cases of objectively perceived clicking are reported, repesenting, respectively, the involuntary and voluntary type, in each of which it was possible to make a very satisfactory examination of the mouth of the Eustachian tube during the production of the sound.

In the first instance a distinct clicking or snapping sound could be heard at a distance of about twelve inches from the ear, which was isochronous with the up-and-down movements of the larynx. The ear drums were a little retracted, but otherwise normal. The spasm consisted chiefly in a jerky, somewhat violent muscular movement of the muscles of the pharynx and palate, causing an approach toward the middle of the posterior pillars of the palate. The mouth of the Eustachian tubes was also involved in those movements in the sense that at each spasm the posterior lower lip moved forward and upward in such a way as to greatly narrow the opening of the tube.

This patient was 24 years of age. The condition had lasted for two years. The clickings occurrred in quickly succeeding waves from ten to twenty at a time at the rate of about sixty a minute, and were more persistent when the patient was tired and exhausted, while during periods of quiet and restfulness they were nearly absent.

Case II., The movements in the throat were less manifest, consisting chiefly of a slight, jerky contraction of the posterior pillars. There was an upward and forward movement of the Eustachian tube. This sound could be produced by movement of the throat similar to that made in the act of yawning *Richards.*

Notes on Otitic Epilepsy, with Report of a Case Relieved by Mastoid Exenteration.

B. ALEX. RANDALL, Philadelphia (*The American Journal of the Medical Sciences*, August, 1905). The case reported is one of the rare ones of apparently true epilepsy due to ear disease. The patient was a boy aged eight years, apparently in good health, who received a drenching by a hose with a penetration of water into the left ear in August, 1904, followed by

acute suppuration. As this slackened epileptiform attacks, sometimes four or five in a day, began about September 1. The attacks occurred almost daily, sometimes twice a day, with spells of unconsciousness, lasting about 60 seconds.

September 22 he was operated on by tympanic exenteration and the attic and antrum curetted smooth, the ossicles being markedly carious and the antrum filled with granulation tissue, but as there was no evidence of mastoid involvement, the operation was limited to the tympanum. The posterior wound did not heal well, and the epileptiform attacks continued once or more nearly every day. He was operated on again on December 1, when complete exenteration of the mastoid was done, finding unhealthy bone and granulations in the mastoid, but its inner depth apparently everywhere sound. The lateral sinus was laid bare, without finding granulations or pus in the sulcus, and the tegmen removed from the attic and antrum with like negative finding.

During the interval between the two operations the attacks had been more numerous than before, the minor tonic convulsions being reported as sometimes twenty in the night, as well as severe and repeated in the day. Following the second operation the attacks steadily diminished in severity, and on April 14 it was reported that the boy seemed entirely cured.

Richards.

Report of a Case of Infective Sigmoid Sinus and Jugular Thrombosis Complicated by Leptomeningitis—Lumbar Puncture—Subdural Irrigation—Death.

RICHARDS, New York (*Archives of Otology*, Vol. XXXIV., No. 3). In a boy age 6, the present illness is due to an acute process grafted upon an old chronic suppurative ear disease. A Stacke-Schwartze operation was performed. Through a pinhole perforation in the sinus groove immediately over the knee there issued, with each pulsation, a jet of thin fluid pus. The sinus groove was removed from a point beyond the knee to near the bulb and a moderate-sized perisinous epidural abscess evacuated. Granulations invested the sinus knee, the upper portion of the vertical limb of the sinus and the adjacent dura. The vein dimpled evenly in all directions, pulsated and was supposed to be normal. Temperature 99 4-5 degrees F. Four days later the temperature suddenly jumped to 104 degrees F., fell to 102 3-5 degrees F., then up again, reaching 105 degrees F. Stiffness of the neck and marked irritability indicated

meningeal invasion. The sinus was opened and found completely obstructed by a thrombus. The slit on the sinus wall was extended out on the lateral sinus beyond the thrombotic involvement. Jugular resection was made, then the clot removed from the bulb. A free return flow from below evidently came from the condylars, the inferior petrosal sinus or from both.

As there was no improvement, lumbar puncture was made. The turbid fluid withdrawn showed streptococci in abundance, pus cells and diplococcus. Following lumbar puncture the temperature fell 4 degrees, remained at 100 3-5 degrees F. for 14 hours, when it again jumped to 105 degrees F. A second lumbar puncture and an attempt to irrigate the subdural space proved futile. A few days later the child died, presenting the symptom-complex of a general cerebrospinal leptomeningitis. *Campbell.*

A Report of Two Cases of Acute Otitis Media Suppurativa Followed by Mastoiditis and Meningitis and Caused by the Diplococcus Intracellularis of Weichselbaum.

BACON, New York (*Archives of Otology*, Vol. XXXIV, No. 3). These cases emphasize the great value of making a basteriological examination of the pus in every case of middle each suppuration.

The first case started in with what appeared to be a severe attack of influenza. The middle ear on each side became affected and the disease spread to the mastoid cells. The bacteriological report at the time was that the organism resembled very closely the gonococcus, but very probably was the diplococcus intracellularis. The temperature chart suggested the possibility of a septic thrombus, but with a temperature of 103.8 degrees F. the pulse was 98 and respirations 12, and next day, with a temperature of 102.4 degrees, the pulse was 94 and respirations 8. Improvement after operation was due probably to relief of intracranial pressure by the copious bleeding. Recovery took place in this patient.

The second case had meningitis when admitted to the hospital. When the dura was exposed in the tempero-sphenoidal region it was found much thickened and covered by granulations. Pus from the external auditory meati contained pneumococci and the diplococcus intracellularis meningitidis of Weichselbaum. The patient was dull and apathetic after the operation. She became comatose, hypostatic pneumonia developed and death supervened. *Campbell.*

A Case of Bacillus Pyocyaneus Pyemia Following Ear Disease.

DR. T. J. HORDER, (*Pathological Society,* London, April, 1904), describes a case of bacillus pyocyaneus pyemia following ear disease. The bacillus pyocyaneus might be pathogenic to man as the partial or sole cause of abscesses, as setting up a form of dysentery, or as (rarely) causing a general infection. The case recorded was one of these last. The patient was a man suffering from otitis media of long duration. He was admitted to hospital for fever, severe headache and delirium. Diarrhea set in a week later. There were no signs of cerebral disease. Widal's test was twice negative, and there was a leucocytosis of 32,000. Emaciation was very marked. The fever was not high, but was continued in type. During the fifth week of the patient's illness paraplegia appeared. Death occurred at the end of this week. At the post-mortem examination the brain and the membranes were natural. Green pus was found in both middle ears, in several abscesses in the lungs, and in a large abscess of the spinal meninges. From this pus the bacillus pyocyaneus was grown in pure culture, pathogenic to animals giving the usual cultural reactions of this organism. Dr. W. Bulloch said that it was possible that the general infection might have taken place after death from from the point of infection in the ears. He had frequently seen spastic paraplegia come on in the course of bacillus pyocyaneus poisoning, but he had no explanation of the disease. It was extraordinary that the bacillus pyocynaeus was not more pathogenic to man, as it was so markedly pathogenic to animals. Mr. L. S. Dudgeon said that he had seen two cases of bacillus pyocyaneus infection; in one of the cases he had been able to find the organism in the blood during life. *Wyatt Wingrave.*

The Value of the Present Quantitative Tests for Hearing, with the Demonstration of a New Apparatus.

SOHIER BRYANT (*New York Medical Record,* April 1, 1905). Feeling that up to the present time we have had no ideal method of testing the hearing, inasmuch as what the patient desires to hear is the human voice, and not the tick of a watch, the click of an acoumeter or the note of a tuning fork, the author began experimenting with the phonograph, and after some trouble managed to get cylinders which were of practical use, and which allow the operator to determine accurately the

limit at which the patient is able to hear with sufficient distinctness, so as to repeat the words spoken by the machine.

He claims that this phonographic acoumeter furnishes a test for the human voice which does not vary, and can be employed and repeated indefinitely. It furnishes a sure way of detecting feigned deafness short of total bilateral deafness. Monosyllables are preferred to longer words, as polysyllables gave the patient an opportunity to guess the sounds not distinctly heard.

Unfortunately he gives us no idea either as to the maker or the cost of this apparatus. *Richards.*

Two Anatomic Anomalies Encountered in Living Subjects During the Performance of Mastoid Operations.

BRAISLIN, Brooklyn (*Archives of Otology,* Vol. XXXIV., No. 3). I. Hiatus of large size in the cortex of the mastoid, opening directly into the mastoid cells.

This fissure three-quarters of an inch long by a quarter broad, lay in the line of the masto-squamosal suture. The first attack of mastoid inflammation gave rise to early involvement of the cervical lymphatics, so extensive as to require their thorough removal.

The present attack presented gradually increasing pain, and a septic temperature out of proportion to the disclosed mastoid disease. This could be attributed to the absence of the cervical glands.

II. Unusual depth of the supra-meatal depression in the triangle of Macewen.

In this case a depression five-eighths of an inch deep was disclosed. It stopped short of the mastoid antrum.

Campbell.

A Case of Mastoiditis in an Infant of one and a half years, with a Sequestrum Consisting of a Large Segment of the Petrous Portion of the Right Temporal Bone—Removal of the Sequestrum and Stapes—Recovery.

BRAISLIN, Brooklyn (*Archives of Otology,* Vol. XXXIV, No. 3). In an emaciated, marasmatic infant through whose auditory canal a loose sequestrum was detected by a probe, exuberant granulations filled the tympanum. The author removed, without anæsthesia a large sequestrum, pyramidal in shape, with its base representing the outer cortex of the mastoid and apex containing about one-quarter (the upper and

posterior segment) of the annulus tympanicus. It represents the entire bony framework between the auditory canal and tympanic cavity below and the dura above A week later the whole stapes was easily removed from amidst a mass of granulations. *Campbell.*

The Importance of an Early Aural Examination in Acute Diseases of Children.

JAMES F. MCKERNON, New York City (*Journal American Medical Association,* January 7, 1905). The author thinks that it is just as important that children suffering from the acute exanthemata have their ears examined every day as it is that they be seen for their general condition, since the mortality from this disease is quite as large fom the aural complications as from any other. Many cases of deaf mutism, as well as the legion of chronic purulent ears, with their sequelæ, might be avoided if this precaution were taken. It should be done as a routine measure, since in a large number of the cases there is no symptom pointing to an aural condition until after the damage has occurred. *Richards.*

Some Mooted Points in the Treatment of Protracted Cases of Acute Middle-Ear Diseases and their Complications.

WIENER, New York (*Archives of Otology,* Vol. XXXIV., No. 3). The author is an advocate of ultra-conservatism, and for such makes a bad showing, viz., forty-two cases of acute otitis media with four mastoid operations and one death.

The author claims that it is unwise to operate before pus accumulates throughout the mastoid structures, because if operated on earlier they do not heal so readily. This is surely bad practice to allow infectious matter to remain in the mastoid, and there are no reliable reports of mischief done by early operation. *Campbell.*

Protruding Auricles Treated by Operation.

T. G. OUSTON (*British Medical Journal,* July 4, 1903). The method consisted in removing skin and cartilage from an area of the posterior surface of the auricle and stitching it to a corresponding denuded area over the mastoid.

Wyatt Wingrave.

A New Method of Treating Suppurating Catarrh of the Middle-Ear.

A. GRAY (*Lancet*, April 18, 1903) used a saturated solution of iodoform in anilin (1 to 7), applied (after syringing) on cotton wool mops, care to be employed in drying surfaces to be treated. Particularly useful in tubercular cases.

Wyatt Wingrave.

Otolith of Ext. Auditory Meatus.

GODWIN, (*Brit. Med. Journal*, Mar. 4, 1905). Female aet. 30, deafness and tinnitus since childhod. Meatus blocked with hard substance. Extracted with forceps Consisted of wax mixed with epithelium and calcium phosphate. Weight 4½ grains. *Wyatt Wingrave.*

Pyemia Due to Bacillus Pyocyaneus in a Patient Suffering with Chronic Suppuration of the Middle-Ear.

HORDER, (*Lancet*, April 23, 1904). (Pathol. Soc., Lond.) Patient died after 5 weeks general pyemia, green pus being found in both ears, lungs and spinal meninges, affording pure cultures of B. Pyocyaneus. *Wyatt Wingrave.*

Labyrinth Caries—Vertigo—Operation—Recovery.

CUMBERBOTCH (*Lancet*, June 4, 1904). Woman, aet. 22, suffered with chronic suppuration middle ear. Radical mastoid was done 12 months later. She suffered extremely with vertigo. Wound reopened, carious labyrinth removed. Recovery with freedom from vertigo. *Wyatt Wingrave.*

II.—NOSE AND ACCESSORY CAVITIES.

The Operative Treatment of Chronic Suppuration of the Frontal Sinus.

A. LOGAN TURNER, Edinburgh (*Transactions Section on Laryngology and Otology, American Medical Association*, 1904). The symptoms which would make surgical interference imperative are those suggesting cerebral complication; pain, usually of the nature of headache, which may be very severe and persistent, the distension of one of the bony walls of the cavity or the presence of a fistula discharging externally, disturbance of the general bodily health by the continued suppuration and general mental depression. Evidence as to the amount of intracranial complications which follow empyema of the

frontal sinus is up to the present time rather meagre. The author has found in literature, including his own cases, forty-two instances of intra-cranial complication associated with suppuration of the frontal sinus.

He thinks the number of cases in which intra-nasal treatment absolutely cures must be very small, although some of the more aggravated symptoms are relieved and the state of the patient may become more satisfactory when the intra-nasal condition is carefully attended to.

As to what operative procedure is to be adopted, there are two main principles. First, the sinus is opened and drained into the nose with preservation of its cavity. Or, secondly, the sinus is obliterated by the removal of one or more of its bony walls, and there is no longer any cavity with which to deal. In the first instance there is always a sinus remaining which may subsequently become the seat of fresh infection. In the second there is a varying amount of disfigurement, a matter of considerable moment in this part of the body, and which may assume considerable proportion. What is desired is some method by which we may best obliterate the cavity and produce the minimum of disfigurement. The Ogston-Luc operation, which consists in opening the frontal sinus through its anterior wall, careful curetting of its interior and establishing a large communication between the sinus and the nose, and at the same time destroying the anterior ethmoidal cells in the region of the naso-frontal duct, with closure immediately or soon after the external wound is first considered. This has been the operation most usually performed, but the author thinks the results which have followed it have been far from satisfactory. Of 55 cases he found 32 cures and 23 failures; that is to say, a percentage of 58 successful operations, and is to be chosen for comparatively recent cases in which the dimensions of the sinus are limited and the fronto-nasal canal roomy and the ethmoidal labyrinth free from suppuration.

Statistically the results from the obliteration method, the method in main being that described by Kuhnt, are that of 67 cases a cure was effected in all but one.

The mortality after operations has been considerable, Professor Turner having collected 24 in which death followed operation on the frontal sinus. Of the fatal cases the clinical picture has been in the main similar, infection occurring within two or three days of the operation, the diploe of the frontal

bone being invaded by organisms and an osteomyelitis set up. The infection then spreads and is followed by abscess, subperiosteal, extradural or subdural, with general meningitis or cerebral abscess or general septicemia or pyemia, followed by death. Of 24 of the fatal cases 17, or 74 per cent., occurred after opening and draining the sinus (Ogston-Luc). In 15 death followed a single operation, while in 2 more than one operation had been performed owing to the failure of the first to effect a cure. These followed after an operation for obliteration of the sinus. There were more fatalities following secondary operation than primary, since the presence of a discharging fistula in the forehead, as the result of failure to cure a sinus suppuration, places the patient in less satisfactory condition for further interference than if the skin were unbroken. Professor Turner is of the opinion that in the fatal cases the involvement is due to the fact that foci of septic material are left which may contaminate the newly exposed bone in the neighborhood. He asks the question whether the statistics show that the mortality in the last two or three years has diminished as the result of riper experience, and while answering the question in the affirmative, states that of the fatal 24 cases no fewer than 9 have occurred during the last two years. He is in the habit during the operation of using small flushing spoons while removing the diseased mucous membrane, thus keeping a stream of warm saline solution or boracic acid solution constantly playing on the bone. In this way he attempts to remove all septic material at once from the wound, thus lessening the risk of further spread.

The osteoplastic operation is mentioned. The cosmetic results are good, but as the sinus is not obliterated, there still remains the possibility of reinfection.

The operation of Killian is next considered. In this operation the anterior and inferior bony walls of the sinus are resected, the ascending or frontal part of the superior maxilla is removed, and a large opening of communication thus made between the frontal sinus and the nasal cavity so that good drainage through the nose can be established. To reduce to a minimum the deformity which may follow so extensive a dissection, the supraorbital bony margin is preserved as a bridge between the gap formed by the removal of the anterior sinus wall on the one hand and the floor on the other. The results as to cure following this operation have been satisfactory,

and the final cosmetic apearances have proved to be encouraging. As the supraorbital margin is left, the contour of the eyebrow is preserved and the depression which attends the removal of the walls of the sinus is thus minimized. The orbital tissues take a considerable share in the filling of the sinus area, so that the sinking in of the soft parts covering the vertical portion of the sinus is thereby reduced, the orbital fat rising up into the horizontal part of the cavity to considerable extent on removal of the bony floor of the sinus.

Should the cavity be deep there is some degree of flattening above the supraorbital margin which may be diminished somewhat by bevelling the cut edge of the anterior wall of the upper margin of the sinus. Should the operation be performed on both frontal sinuses the septum between the two is removed. The eye should be handled as little as possible, and any undue pressure on it avoided.

Professor Turner's one criticism of the operation is that the cavity is not completely obliterated, as a space remains behind the inner end of the bridge which continues to secrete and discharge a certain quantity of pus utnil a new lining membrane growing upward from the nasal cavity has completely covered the granulations. This may prolong the healing process two to three or more months.

He does not think that there is any single method of procedure applicable to chronic suppuration in the frontal sinus. In the absence of ethmoidal disease and with a small sinus simple opening and draining by the Ogston-Luc method may prove satisfactory. In every other class of cases he would recommend the principle of obliteration of the sinus, and feels that should more extended experience show that the operation suggested by Killian provides satisfactory curative results with less disfigurement than other radical methods, then we probably have at our command an operative procedure which will take the first place. *Richards.*

Rhinoscleroma.

MAX TOEPLITZ and HENRY KREUDER, New York City, (*American Journal of the Medical Sciences,* July, 1905.) Rhinoscleroma has been thought to be a curiosity, but of late seems to lose more and more its endemic character and to spread. About 600 cases are known to exist. The principal seat is the western part of Poland, particularly Galicia. The two cases reported are from Galicia.

The first in a woman 25 years old. Had a tumor simultaneously in the mouth and in the nose, which latter had been obstructed for three years.

The second case was 27 years of age. Had suffered for twelve years from permanent headaches and for eight years with impaired nasal breathing. The outer nose was not changed, the nasal entrances were widened, more roundish, the alæ nasi pushed outward and the entire cartilaginous nose was knoblike and thickened. The left nostril was entirely obstructed by a swelling broadly attached to the alæ nasi and the nasal floor. It was whitish-gray and hard. Its extension backward could not be followed. The right nostril was narrowed by infiltrated folds, which still left room for breathing. In the naso-pharynx there was a roundish, somewhat nodular swelling at the right near the center, close to the pharyngeal surface of the velum. The uvula was missing, and at its former place the velum was irregularly thickened by nodules.

A detailed histological and bacteriological description is given by Dr. Kreuder.

Rhinoscleroma begins in the posterior nares in the form of granulomatous proliferations upon the surface of the mucous membranes, or as diffuse infiltrations of the submucous tissue. These proliferations consist of nodules associated with infiltrations of the subepithelial layer. The blood vessels obliterate and are transformed into bundles of connective tissue; the nodules shrink and the proliferations become contracted, hardened and firmly attached to the underlying tissues. The process propagates diffusely and slowly around the posterior nares, the nasal cavity and vestibule and naso-pharynx.

Dr. Kreuder was able to demonstrate a bacillus morphologically like the bacillus of Friedlander except that the sleroma bacillus is positive to Gram's stain, while the Friedlander bacillus is negative. *Richards.*

The Inferior Turbinated Bone: Its Function, Diseases and Treatment..

WENDELL C. PHILLIPS, New York City (*The American Journal of the Medical Sciences,* July, 1905). Hypertrophy and deformities of the inferior turbinate may interfere with nasal respiration, with drainage, give rise to pressure symptoms and subsequently to mental depression, and prevent proper intra-nasal hygiene. This hypertrophy should not be confounded

with congestion or inflammation. When the symptoms and appearances indicate pressure, altered secretion, interference with drainage and the function of the nose the hypertrophic tissue and portions of the bone should be removed. To do this escharotics should never be employed, such as chromic acid and the like, and the galvano-cautery is of doubtful efficiency.

The best method of operation for anterior hypertrophy is by clean-cut means of specially devised scissors through both soft tissue and bone, while the cold wire snare, consuming from a half hour to an hour in cutting through the growth, offers the best method for the removal of posterior hypertrophies.

The author has had the best of results after operation with the use of 12 per cent. solution of acetotartrate of aluminum, to which may be added a few drops of weak adrenalin solution as an application to the wound. A very thin piece of absorbent cotton is saturated in this solution and then laid against the wound. The nostril is not plugged, and the disinfectat properties of the acetotartrate of aluminum render it safe to leave in situ for several days. He has made use of this method for several years, and has never had a case of secondary hemorrhage or infection after its use. *Richards.*

Glioma of the Nose—Report of Two Congenital Cases.

J. Payson Clark, Boston, Mass. (*The American Journal of the Medical Sciences*, May, 1905). Outside of the brain and spinal cord true glioma is very rare.

The author's first case was a boy of 2 years, who had a rounded tumor of the nose about the size of a robin's egg, which had existed from birth, and caused considerable deformity. It was soft to the touch and resembled very stongly in appearance and consistency a fatty tumor. The situation was in the front of the nose. On looking into the nose the left nostril was almost completely obliterated by a pinkish-gray polypoid growth, which had connection with the external tumor. A piece of this, on being removed, was found to be a glioma. The tumor was afterwards removed, with no tendency to new growth.

The second case was observed in a child of 10 weeks, a pinkish-looking polypoid mass obstructing the left vestibule, the site of which was higher up in the nose and appeared to be from the septum. On removal the hemorrhage was free, but easily

stopped. Microscopic examination showed the tissue to be gliomatus in character, the tissue consisting of cells and fibrils in varying proportions. Some of these were quite large, with eccentric nuclei and fibrillary processes. This growth also showed no tendency to recur. The case was under observation for a year.

The author searched the medical literature of more than ten years past, but could find no more reported cases of glioma of the nose. *Richards.*

The Treatment of Chronic Nasal Catarrhs with Sulphur.

LOUIS KOLIPINSKI, Washington, D. C. (*Medical News,* August 12, 1905). The official sulphur praecipitatum U. S. P. is the form of sulphur used, and the author has had good results with it when administered by insufflation. He uses it in plegmonous, simple chronic nasopharyngitis, hyperplastic nasopharyngitis without organic obstructions the fullness and post-nasal dryness, the post-nasal dropping and incrustration, the hawking, expectorating and vomiting cease. In simple chronic rhinitis, hypertophic stage, the nasal discharge is diminished, the mucopurulent and purulent exudate becomes clear and much less, the intermittent nasal occlusion ceases, the dull frontal headache is gone, the manner brightens, the itching of the nose, sneezing and cough abate. The diffusedly swollen deep red membrane diminishes in size and lightens in color.

The method of using it is as follows: The anterior nasal cavity is exposed with a speculum, the tip of the nose elevated and the sulphur freely and thoroughly blown in with a strong powder blower. This has been properly done when the powder appears from the mouth and opposite nostril and an irritating cough results. *Richards.*

The Radical Operation for Empyema of the Frontal Sinus.

W. FREUDENTHAL, New York City (*Journal American Medical Association,* February, 1905). The author thinks that conservative methods should be tried up to the point where they cease to be feasible, but that when we have to operate, Killian's mthod is the one which seems at present to give the best results.

The first opening into the frontal sinus should always be made below the outlined bridge, and only after exploring the sinus should another above it be made. In one of the author's

cases he found the dura matter presented itself after cutting away the bone immediately above the bony bridge. As the external wound is closed immediately after the operation, he has found the cosmetic results to be good.

A number of case histories are given in detail.

Richards.

Sarcoma of the Vomer, with Extensive Involvement of the Adjacent Structures and Metastasis in the Cranium.

ARTHUR P. HERRING, Baltimore, Md., (*The American Journal of the Medical Sciences,* August, 1905). The patient was seventeen years old. First sought relief in March, 1904, on account of an injury to the right side of the head occurring in December, 1903. At that time the cervical glands were removed and were said to be tuberculous.

First seen by the author in June, 1904, at which time there was a small vascular tumor atached to the vomer in the right nostril, extending about half way across the posterior nares, without involvement of the pharyngeal wall. This increased rapidly, invaded the naso-pharynx, occluded the posterior nares, and in September there was pronounced bulging of the right cheek, depression of the soft palate and complete filling of the naso-pharynx. Complete occlusion of the right nostril.

October 20th the upper jaw was resected but the patient did not survive the operation, living only six hours. Post mortem examination showed extensive involvement of the centers of the anterior bony areas of the floor of the brain, showing direct growth of the tumor from the nose. The character of the growth was that of a spindle-cell sarcoma.

Richards.

The Treatment of Chronic Empyema of the Antrum, Both Simple and When Combined with Empyema of the Ethmoid and Sphenoid.

R. BISHOP CANFIELD (*Ann Arbor, Mich. Medical News,* March 25, 1905). Cases of dental origin should, after extraction of the tooth and the removal of any carious material, be treated as though the disease had arisen intranasally. For reaching the antrum he considers the inferior meatus as the easiest place of access and the one usually to be chosen, free approach to the lateral wall of the nose being secured by removing the inferior edge of the inferior turbinate and the antrum broken into by means of a drill, mallet or chisel, three-

quarters of an inch by one inch in diameter. The electric drill is to be preferred, as most instruments splinter the bone badly, leaving the edges of the wound rough and irregular and often forcing pieces of bone into the antrum.

If the case canot be cured by cleansing and other measures introduced through such an opening, the more radical so-called Luc-Caldwell operation must be done. *Richards.*

The Correction of Nasal Deformities by Subcutaneous Operations.

JOHN O. ROE, Rochester, N. Y., (*The Medical Record,* July 1, 1905). Dr. Roe reports a number of cases of extreme nasal deformity in which good results were obtained by one or more subcutaneous operations with the aid of plastic surgery, the required parts being taken from the lips and adjacent regions. As facial deformity powerfully affects the mind, it is one of the important duties and privileges of the rhinologist to do what he can to correct these deformities.

Deformities are corrected for the most part from within the nose, one of the first essentials being to separate the attachment of the skin and periosteum from the nasal bones and then make the correction in accordance with the needs of the individual case, afterwards fitting a suitable splint of the desired shape and size made to fit the nose after the deformity is corrected and held in place by adhesive plaster across the face. *Richards.*

Observations on the Therapeutic Value of Medicated Ointments in Certain Affections of the Nasal Chambers.

ALEXANDER W. MACCOY, Philadelphia, (*Laryngoscope,* February, 1905). The author has largely substituted the use of ointments for nasal washes, sprays and powders, and has found relapses much less frequent in cases of patients undergoing treatment for chronic conditions. The ointments are given to the patient in collapsible tubes as a protection from contamination, and since this form of dispensing renders them most convenient for use at all times and places. He thinks our constant and persistent use of nasal washes, especially during the winter season in our climate, tends to harmful results. The same class of medicines are used as are generally employed in washes, vapors and powder, the difference shown being in their enhanced value in effecting desired results.

He has found quinin especially useful in ointment form in

case of chronic rhinitis and in the edematous condition present in vaso-motor cases. The ordinary vaseline ointment is too thick and firm for use, one to two drams of the fluid vaseline being require to each ounce of the ointment.

Richards.

Naso-Fibroma Treated by Injections of Monochloracetic Acid.

HARMON SMITH, New York, (*Laryngoscope,* April, 1905). The fibroma was in the right naris, entirely occluding it, in a boy of sixteen. Attempts to remove the growth having failed, fourteen injections of from three to five minims of monochloracetic acid at intervals varying from three weeks to two months were made into the tumor. Nothing now remains of the tumor but a fibrous curtain covering the entire post-nasal space. The boy gained fifteen pounds in weight.

In using monochloracetic acid care should be taken that all of the acid is inside the tumor and does not get into the larynx. This happened to the author on one occasion and produced a laryngeal spasm and pain on swallowing of such intensity that the patient ate nothing for three days.

Richards.

Modern Methods of Accessory Sinus Treatment.

H. HOLBROOK CURTIS, N. Y., (*Laryngoscope,* May, 1905).

The Antrum of Highmore; the Removal of the Greater Part of Its Inner Wall Through the Nostril for Empyema.

OTTO T. FREER, Chicago (*Laryngoscope,* May, 1905).

Both Dr. Curtis and Dr. Freer advocate the treatment of empyemata of the antrum through the nose by the removal of a greater or less portion as may be necessary of the naso-antral wall, together with the anterior portion of the inferior turbinate. In many cases they think that this operation will produce as satisfactory results as the more radical one through the canine fossa, and is very much more satisfactory to the patient than openings made through the tooth sockets.

Richards.

Adeno-Carcinoma of the Nose.—Killian Operation for Radical Removal.

JOHN MCCOY, New York, (*Laryngoscope,* April, 1905). The patient, 47 years old, printer, had an adenocarcinoma obstructing the right nostril and extending up into the frontal sinus, which was removed by the Killian method of operation

on the frontal sinus with good results. Six weeks after the operation the frontal sinus was obliterated, filled with healthy granulation tissue, and there was no signs of recurrence. The cosmetic result was good, as it was not apparent to the casual observer that any operation had been done. *Richards.*

Turbinectomy.

D. S. REYNOLDS, Louisville, Ky., (*Laryngoscope,* April, 1905). Reynolds removes the inferior turbinate with a saw and then introduces a pack against the site of the removed portion. He has never known occlusion of the inferior extremity of the lachrymal duct to follow the operation.

He does not think that septal ridges and spurs are attended by any inconvenience to the patient unless they create obstruction to the free passage of air through the nose.

Richards.

Inspection of the Antrum of Highmore.

KELLY, (*Lancet,* Sept. 17, 1904), advocates ocular inspection by means of a large speculum similar to aural, through an opening in canine fossa made by trocoa. He discusses the various morbid conditions suitable to the method.

Wyatt Wingrave.

III.—PHARYNX.

On Pneumococcal Sore-Throat with Notes of a Fatal Case.

W. PASTEUR, (*Lancet,* May 27, 1905). Among the acute inflammations of the faucial region there is one, pneumococcal angina, which has not apparently as yet received in this country the attention it deserves. At a recent public examination not a single candidate even mentioned this condition in discussing the differential diagnosis of diphtheria. Pneumococcal inflammations of the fauces and larynx are, however, well worthy of attention on account of the close clinical resemblance they may present to other acute inflammations of those regions, especially diphtheria.

The occurrence of inflammatory lesions of various mucous membranes, with or without membranous exudation, in association with pneumonia and broncho-pneumonia, has been recognized for many years. A very remakable case of this kind is recorded by Cary and Lyon. But examples of primary inflammation of the faucial region are much more uncommon.

Jaccoud, T. K. Monro and others have placed on record cases of membranous sore throat of pneumococcal origin which clinically were very like diphtheria. The appearances in the case about to be related differ widely from these and afford a good example of another variety of pneumococcal pharyngitis, the "angine erythemateuse pneumoccoccique" of French authors.

Referring to the probable frequency of acute membranous tonsillitis and pharyngitis of pneumoccoccal origin, Foulerton remarks that "the exact bacteriologcal identification in these cases is rendered difficult by the fact that the organism is a frequent parasite of the healthy mouth. But the number of cases in which there are the formation of a false membrane and destruction of the superficial layer of the epithelial membrane associated with the presence of the coccus in predominant numbers and without any of the other bacteria—B. diphtheriae, streptococcus pyogenes and saccharomyces albicans—which are known to cause similar lesions, leaves little doubt as to the fairly frequent occurrence of an acute membranous pharyngitis due to this cause."

A healthy, well-nourished boy, aged three and a half years, was seized with sudden illness on October 24th, 1903. The prominent symptoms were sore throat with great pain on deglutition and high fever, which had persisted. There was no initial vomiting nor had there been any signs of laryngeal implication or of pulmonary trouble. He had only taken small quantities of milk with much difficulty. He was admitted to the Middlesex Hospital on the fourth day of illness in the following condition: The face was pale with a dusky malar flush. The respirations (40 per minute) were not labored. The pulse (120) was soft, full and regular. The glands at the angle of the jaw were moderately swollen on both sides and very tender. skin was dry and hot (temperature, 103 degrees F.). There were no signs of desquamation and no puffiness. There was no discharge from the nose or ears. A careful examination of the heart and lungs revealed no abnormal signs. A specimen of urine passed soon after admission gave a positive result to Ehrlich's diazo reaction; it was free from albumin. The uvula, soft palate and faucial pillars on both sides were slightly edematous and intensely red and glazed. Both tonsils were somewhat swollen and intensely injected. There were no exudations of any kind, and no plugging of the follicles of the tonsils. The posterior wall of the pharynx could not be seen.

The tongue was rather thickly furred and the breath was very offensive.

Progress of case.—6,000 normal units of diphtheria antitoxin were injected on admission and a swab was taken from the throat for bacteriological examination. The temperature ranged high throughout the illness, exceeding 103 degrees every day, and only once falling as low as 101 degrees. On November 7th the apearance the throat was much the same. There were no signs of exudation. The patient had great difficulty in swallowing and frequent regurgitation of fluid through the nose. The enlarged spleen could be felt below the ribs, but it was not tender. The swab cultures yielded an abundance of micrococci, but no bacilli were present. Widal's reaction gave a negative result. No signs of broncho-pneumonia were present. There were considerable enlargement and much tenderness of the glands at the angles of the jaw. On the 10th, attempts to feed through a nasal tube failed; nutrient enemata of milk and beef tea had been given since the 8th. On the 11th there were signs of cerebral irritation. The child was curled up to one side with the wrist flexed and the knees bent up. He strongly resented all interference, cried out at sudden noises, and had definite photophobia. No paralytic symptoms were observed. During the last two days the fetor of the breath had increased and become distinctly gangrenous. On the 9th the throat was still intensely red and glistening, but today (11th) the whole of the uvula and the adjacent portions of the soft palate were brown and sloughing. There were no signs of peeling and the urine remained free from albumin. The nutrient enemata were omitted on account of rectal intolerance. On the 14th the temperature had been more remittent since the 11th, and the patient was growing rapidly weaker. The throat was sprayed frequently with chlorine water, but without appreciable effect on the fetor and unsuccessful attempts had been made to irrigate the nasopharynx with antiseptics. There was now a gray gangrenous slough involving the uvula and the palatal arches. The respirations had risen from 30 to over 70 per minute and signs of broncho-pneumonia had made their appearance in the left lung, both in the upper and lower lobes. Death took place on November 15th, the twenty-second day of illness. There was slight diarrhea during the last three days. There was no nasal discharge at any time.

Necropsy.—A post-mortem examination was made 31 hours after death, the weather being cold. The body was emaciated and somewhat rachitic. No beading of ribs could be seen. There was some excoriation at the right angle of the mouth. The whole of the soft palate, both pillar of the fauces, and the tonsils formed a large greenish gangrenous mass. The glotto-epilottic fold and pyriform sinuses were also discolored and bathed by a thin greenish purulent discharge. The sloughing area reached as far forwards as the hard plate. The glands at the angle of the jaw and those of the posterior triangles were much enlarged. The right pleura contained two and a half ounces of thin reddish pus. On the posterior aspect of the left pleura, just on a level with the bifurcation of the trachea, was a circular patch of softening. The esophageal, bronchial and mediastinal glands were enlarged. The bronchi were congested and contained some thick purulent exudation. The upper lobe of the left lung was congested. There was one small gangrenous patch on the posterior aspect. The lower lobe was riddled with patches of broncho-pneumonia which were becoming gangrenous. The largest gangrenous cavity was of the size of a hazel nut. There were similar changes in the right lung. A gangrenous patch of the size of a walnut was in the upper lobe, and there were areas of collapse in the lower lobe. The heart was natural. The stomach was contracted and healthy. The esophagus was healthy. The kidneys were somewhat enlarged and cloudy. There was cloudy swelling and much post-mortem discoloration in the liver. The spleen was enlarged and congested. As regards the head, the scalp, calvaria and sinuses were natural. There was slight congestion of the pia-arachnoid and some excess of cerebro-spinal fluid. No meningitis was present. The brain substance was natural.

Bacteriology.—Cultures obtained post-mortem from the pharynx and lungs were examined by Mr. A. G. R. Fullerton, who informed me that the diplococcus pneumoniæ was present in predominating numbers, together with a bacillus (probably the result of post-motem inflection) in smaller quantity. The diplococcus was tested on a mouse and found to be of normal pathogenicity for that animal.

The difficulties surrounding the clinical diagnosis in this case were very great. The child was too young and too desperately ill to permit of any really satisfactory examination of the naso-pharynx being made. Diphtheria antitoxin was injected as a

precautionary measure only, for the sudden onset, severe initial symptoms and persistent high temperature did not lend support to this view of the case. The absence of all exudation on the tonsils and fauces and the total absence of any signs of desquamation excluded the diagnosis of scarlet fever. On the whole, the appearance of the fauces and soft palate on admission more nearly resembled erysipelas than anything else, but the very moderate degree of edema militated strongly against this view. The possibility of a pneumococcal inflammation of the pharynx was carefully considered but could hardly be maintained in the face of the negative result of the first bacteriological examination. I am satisfied that the pharynx was the site of primary infection. The lungs were repeatedly examined and no signs of broncho-pneumonia or other lesion detected until the later stages of the illness, when gangrene of the palate was already well marked.

The occurrence of gangrene in pneumococcal inflammations of mucous membranes is well established. Munro's patient recovered with a perforation of the faucial pillars, and I may fitly refer here to a remarkable case which came under my notice some time ago and was placed on record by Foulerton. The patient, aged 26 years, had suffered from a "quinsy" a fortnight before admission to the Middlesex Hospital, and had been ill ever since. He died from pyemia three days after admission. The necropsy revealed an almost universal pneumococcic gastritis, with extensive necrosis of the glandular layer of the mucous membrane of the stomach. There was a deepish ragged ulcer in the right tonsil. It seems probable that in this case the primary lesion was a pneumococcic infection of the right tonsil, though this was not proved bacteriologically.

Dr. J. Kingston Fowler had a case of membranous laryngitis arising in connection with an acute pneumococcal inflammation of the lungs. The patient, a man, aged 38 years, was admitted in the fourth week of an acute illness with signs of consolidation in the left lung. He lived for 34 days after admission, during which period the greater part of both lungs became consolidated. The necropsy revealed a very extensive pneumonia of both lungs, with a small smooth-walled gangrenous cavity at the posterior apex of the left lower lobe. There was a patch of toughish adherent membrane on one of the vocal cords from which Mr. Fullerton obtained a pure culture of

diplococcus pneumoniæ. This organism was also present in preponderating numbers in the cultures obtained from scrapings of the lung tissue just outside the cavity in the left lung. The patient had not presented any laryngeal symptoms.

A striking example of pneumococcal laryngitis has been recorded by Seuvre. The case is that of a boy, aged 8 years, in whom symptoms of laryngeal obstruction supervened in the course of an attack of "grippe." Tracheotomy had to be performed and pneumococcus in pure culture was obtained from pieces of membrane coughed up through the tracheotomy tube. It is clear from a consideration of recorded cases that pneumococcal pharyngitis may present different clinical forms. French observers who have paid some attention to the subject describe the following varieties: (1) the suppurative; (2) the pseudomembranous; (3) the follicular; (4) the inflammatory or erythematous, and (5) the herpetic.

The erythematous form was first described by Rendu and Boulloche. The appearance of the fauces described by these observers agrees very closely indeed with that presented by my patient in the earlier stages of his illness. The etiology of their case was interesting. The patient, a nurse in a children's hospital, slept in a dormitory from which during the week preceding her illness three other nurses had been warded with acute pneumonia. Her illness developed very acutely with chills, intense headache and high fever and subsided by crisis with profuse sweating and diuresis after a duration of only 36 hours. There were no pulmonary symptoms.

Wyatt Wingrave.

The Proper Position of the Patient in the Operation for the Removal of Adenoids Under General Anesthesia.

C. R. Holmes, Cincinnati, (*Laryngoscope*, May, 1905). As soon as complete anesthesia is obtained and while the child is still lying upon its back, the hypertrophied faucial tonsils are liberated by a blunt director from any adhesions; a few more whiffs of the anesthetic are given. The child is then quickly turned upon its left side, the left arm and shoulder drawn back so that the former lies on the table behind the child, the right arm is grasped near the shoulder joint by an assistant on the opposite side of the table, who lifts that half of the shoulder girdle away from the chest so as to secure ample breathing space, and at the same time to steady the child, the mouth gag

is reintroduced into the right side of the mouth by the principal assistant who manages the gag and slightly extends and steadies the head, the face is brought even with the left edge of the table or even slightly over the edge and the operator, equipped with an electric forehead mirror and seated on a stool of medium height on the left side of the table, removes the adenoid hypertrophy, quickly and thoroughly with the Gottstein curette or some modification of that instrument, and subsequently examines the naso-pharynx with the index finger of the left hand and removes with curved scissors and forceps any shreds or tags of the growth, or of the pharyngeal mucous membrane that may have been stripped up, as may rarely occur. The faucial tonsils are then removed if necessary with the cold snare or, if soft and ragged, with the curette, the adenectomy having been thoroughly done so quickly as to allow an ample margin of time for a double tonsillectomy before the patient emerges from under the influence of the anesthetic. As soon as the hemorrhage ceases, the patient is rolled over into the supine position, the left cheek cleaned from the few flecks of blood that are upon it, the towel removed from the head, and he is carried to his bed from which he is released the next day, to remain in his room in the hospital for three or four days. *Richards.*

The Lymphatic Drainage of the Faucial Tonsils.

GEORGE B. WOOD, Philadelphia, (*The American Journal of the Medical Sciences*, August, 1905). This is an important experimental study made to discover how the micro-organisms from the tonsil may gain access to the general system.

Injections were slowly made into the tonsil, a solution of Berlin blue and turpentine being used after the method of Gerota. The direction of the drainage as established by the injections was as follows:

"The lymph vessels pass from the external portion of the tonsil through the peritonsillar connective tissue, the pharyngeal aponeurosis, and the superior constrictor of the pharynx, and, as one or two or more fine small vessels run obliquely in a downward, posterior, and outward course, passing below the facial artery. Bending more posteriorly the lymph vessels next run between the internal jugular vein and the stylohyoid muscle, reaching finally the superior surface of an enlarged lymph gland, placed just beneath the anterior border of the sterno-

cleidomastoid muscle, where it is crossed by the posterior belly of the digastric muscle. The efferent vessels from this gland are generally two or three in number, and pass into the neighboring glands of the internal jugular group. Further anastomoses which connects the lower glands of the internal jugular group with those receiving the tonsillar drainage form a complete lymph channel, through which the tonsillar lymph finally empties into the jugular lymph trunk."

This lymphatic gland the author names the "tonsillar lymph gland." *Richards.*

The Significance of Tuberculous Deposits in the Tonsils.

GEORGE B. WOOD, Philadelphia (*Journal American Medical Association,* May 6, 1905). "The tonsillar tissue of the throat, because of its peculiar anatomic construction and its topographical relations, is more liable to become infected by tuberculosis than any other part of the upper respiratory tract. In nearly all cases of advanced pulmonary phthisis the faucial tonsils become inoculated. In about 5 per cent of hypertrophied pharyngeal tonsils some form of primary tuberculosis will be found. Primary infection of the faucial tonsil is a rarer condition.

Tuberculous adenitis in the cervical lymphatics develops in the majority of cases from infection originating sometimes in the faucial tonsils, but more frequently in the pharyngeal tonsil.

The tubercle bacillus is probably unable to pass through the tonsils without having first overcome the vital resistance of the tonsillar tissue.

The danger of systemic or pulmonic infection resulting from a tuberculous lesion in the tonsillar tissues of the throat is about equal to that of tuberculosis of the cervical lymphatics. The lesion to be expected as a resultant infection from the broken-down glands of the neck is a miliary tuberculosis of the lungs. Further than this possibility, tuberculosis of the lymph glands of the neck is no more dangerous than a localized tuberculosis lesion in any other portion of the body.

The tonsils are more resistant to the action of bacterial toxins than ordinary lymphoid tissue." *Richards.*

Methods of Operation on the Tonsils.

WILLIAM LINCOLN BALLENGER (*Chicago, Illinois, Medical Journal,* 1905). The technique of Ballenger's method is as follows:

(a) Anesthesia, general or local.

(b) The dissection of the tonsil from the pillars with a right-angled tonsil knife or Beck's tonsil scissors.

(c) The uniting of the two incisions at the apex of the tonsil, thus converting the three united incisions into an inverted U shape. While the incisions are being made the tonsils are strongly drawn toward the median line of the throat with a pair of vulsellum forceps of special pattern.

(d) The vulsellum forceps are next passed through the fenestra of a wire ecraseur or other form of tonsillotome, the upper blade into the dissection portion, the lower grasping the base of the tonsil. The tonsil thus grasped between the blades of the forceps is drawn through the fenestra of the ecraseur.

(e) The blade of the ecraseur is then closed, thus detaching the remaining lower portion of the tonsil.

As a substitute for the Peter's wire snare he uses a ring blade somewhat after the style of the Mathieu's tonsillotome, but of which the blade is rounded after the manner of cold wire. The instrument thus becomes a tonsillotome and ecraseur all in one. *Richards.*

Cases of Primary and Secondary Tonsillar Hemorrhage Following Removal Both with Tonsillotome and Snare.

EDWARD J. BROWN, Minneapolis, Minn., (*Laryngoscope*, 1905). Case 1. Student 28 years of age, two large fibrous tonsils removed with Bishop tonsillotome. Considerable hemorrhage from a steadily spurting stream at the base of the left tonsil. Astringent applications being of no avail, success was finally obtained by persistent pressure and counter pressure with the thumb and fingers of the right hand.

Case 2. Female 33 years of age, submerged tonsil removed with the Peter's snare, No. 10 piano wire. Fifteen days later severe hemorrhage in the night, persisting for seven hours before controlled.

Case 3. Girl 6 years. Incomplete removal of the tonsil with heavy Peter's snare. Severe hemorrhage two days later controlled with difficulty by the family physician. Two quarts of blood vomited.

The author says that after thorough removal he has never seen serious hemorrhage. *Richards.*

Frenum Uvulae.

F. MARSH (*British Medical Journal,* April 15, 1905). Mrs. L., aged 35, was seen on February 11th, 1905, for chronic ear trouble. On examination of the throat the uvula was seen to be bent forward at an acute angle, and to be tied closely to the soft palate by a distinct band, about the thickness of the frenum linguae, attached in the middle line to both uvula and soft palate. The uvula was quite half an inch long, and the frenum extended the whole length. No discomfort nor inconvenience was experienced by the patient, who was not aware of any departure from the normal.

The case is recorded on account of its rarity. The writer is not aware of any record of a similar condition.

Wyatt Wingrave.

Blood Poisoning from Tonsillitis.

SIR J. OWEN, (*Lancet,* Oct. 15, 1904). Case of male aet. 22 suffering with acute non-diphtheritic tonsillitis associated with high temperature (104.5). There was arthritic and pulmonary trouble with delirium lasting 14 days. He was treated successively with antiseptic toxine, and Roux's sera and finally with iron perchloride with complete recovery. The blood contained streptococci. *Wyatt Wingrave.*

Salivary Calculus Simulating Angina Ludovici.

WYATT WINGRAVE, (*Brit. Lar. and Rhin. Assoc.,* November, 1904). Male aet. 80, had a painful swelling below tongue and around hyoid region for 5 days with difficult deglutition: Fixing of mandibles. Lingual tonsils much swollen, with edema of epiglottis. Incision was made in glosso-alveolar fold near frenum linguae, from which a large calculus measuring 25x8 mm. and weighing 2.5 grammes was removed.

Wyatt Wingrave.

Vincent's Angina.

BRUCE, (*Lancet, July* 16, 1904). Good clinical and pathological description Draws attention to the close similarity between the disease and ulcerative stomatitis.

Wyatt Wingrave.

IV.—LARYNX.

The Effect of the Rays of Radium Upon the Mucous Membrane of the Larynx: A Preliminary Report.

W. FREUDENTHAL, New York City (*The Archives of Electrology and Radiology*, September, 1904). The case is one of tuberculosis of the larynx with the left vocal cord ulcerated and stalactitic excrescenses in the inter-arytenoid space.

A small glass tube of radium containing 0.25 grammes of 20,000 strength was put into a receptacle and the whole screwed on to a strong probe. The probe was bent so as to fit the shape of the larynx and inserted after thorough cocainization. The patient took the probe between her teeth, while an assistant supported its end. The period of time it was held varied from twenty to thirty minutes. It was applied ten or eleven times.

The only effect was that granulation or infiltrations sprung up from different parts of the larynx, diminishing its lumen materially so that the treatment had to be stopped twice on account of slight dyspnœa. These granulations rapidly diminished after cessation of the treatment. On one occasion the voice was improved on acount of some sort of approximation of the vocal cords as a result of the granulations springing up so rapidly, consequently producing a louder voice.

There was no real improvement from a pathological standpoint, although eight weeks after discontinuing treatment the patient reported that she felt easier in her throat and tickling sensation had disappeared to a considerable extent.

Richards.

Foreign Body in the Bronchus; Removal with the Aid of the Bronchoscope—Recovery.

SIDNEY YANKAUER (*New York Medical Record*, February 11, 1905). The child was a boy of ten months who had sucked an orange-pit into the right bronchus, followed by coughing, dyspnea and cyanosis. Operation four hours after the accident, inferior tracheotomy under chloroform. Bronchoscope 7 mm. in external diameter introduced into the tracheal wound and pushed forward until near the bifurcation. Foreign body was seen lying with one end impacted in the right bronchus, was seized in the bronchoscope forceps and the bronchoscope and foreign body withdrawn together. The pit measured 17 mm. long, 6 mm. wide and 5 mm. thick.

Only a very small amount of chloroform was used, the anæsthetic being discontinued as soon as the trachea was opened. *Richards.*

A Case of Paralysis of the Recurrent Laryngeal Nerve, from Aneurism of the Arch of the Aorta.

HILL HASTINGS, Los Angeles, Cal., (*Journal A. M. A.*, June 3, 1905). In this case the diagnosis of aneurism was made from the laryngoscopic examination. The patient was referred on account of hoarseness and there was complete paralysis of the left vocal cord, which remained in a position of cadaveric rigidity during phonation and respiration. There was no tumor of the larynx or neck. Aneurism pulsation was in the right second intercostal space, close to the sternum, and distinctly seen when the chest is in the proper light. Pulsation was synchronous with the apex beat. The left recurrent laryngeal was pressed upon by the aneurism.

Richards.

Chronic Laryngitis.

E. FLETCHER INGALS, Chicago, (*Laryngoscope*, March, 1905). Ingals reports eighty to ninety per cent of the cases as due to or kept up by nasal obstruction, and the first thing to do in order to cure larynx is to remedy the nasal condition. Local applications of stimulating or astingent character should be of sufficient strength to cause discomfort for one or two hours.

He has not found watery solutions in the atomizer in the hands of the patient as very satisfactory so far as getting the solution into the larynx and trachea is concerned. Oily solutions are more readily inhaled but as commonly employed by the patient, have little effect.

The patient's general condition should be looked after.

Richards.

An Unusual Case of Edema of the Glottis.

EMIL MAYER, New York City, (*The American Journal of Medical Sciences*, August, 1905). The case was one of edema of the glottis engrafted upon an hereditary syphilis of the epiglottis, which latter had never produced any notable symptoms relative to the throat except the constant cough. When seen there had been constant dyspnea for thirty-six hours.

There was a large, glistening mass at the base of the tongue, filling the entire pyriform sinus, which, on being incised, exuded a quantity of thick, bloody and ill-smelling fluid, which showed the presence of staphylococcus albus and streptococcus. Recovery was rapid. *Richards.*

Laryngeal Stridor in an Infant.

R. FULLERTON (*British Medical Journal,* January 16, 1904). Infant 3 days old had repeated attacks of suffocation and stridor, lasting 30 minutes, with intervals of 10 minutes. Cyanosis. Oxygen and artificial respiration relieved symptom. Stridor was inspiratory: Glottis could not be seen and there were no adenoids or enlarged tonsils. Tracheotomy under chloroform completely cured stridor. Tube removed and stridor returned but gradually disappeared. Recovery complete. (No reference to nasal breathway state. Abstractor).

Wyatt Wingrave.

Papillomatous Growths Occurring in the Larynx of the Child.

L. D. BROSE, Evansville, Ind. (*Journal American Medical Association,* March 18, 1905). Two cases are reported, the first a boy of 11, in which the growth was removed by the use of an intra-laryngeal snare, and the second in a child of 3 years, from which the growths were removed after a preliminary tracheotomy and secondary thyrotomy. The small size of the larynx in a child renders thyrotomy a difficult operation.

Richards.

A Century of Intubations.

GEORGE F. COTT, Buffalo N. Y., (*Laryngoscope,* February, 1905). The intubation tube must be allowed to remain in position until the patient is perceptibly improved. This may be twenty-four hours or five or six days. A certain number of cases will need re-intubation. This cannot be told beforehand. Do not allow the patient to partake of solid food while wearing the tube. *Richards.*